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In the Supreme Court of the United States october Term, 1983: No. 45 & O.

THE SWAN CARBURETOR COMPANY,
Petitioner and Appellant Below,

CHRYSLER COEPORATION,
Respondent and Appelles Below.

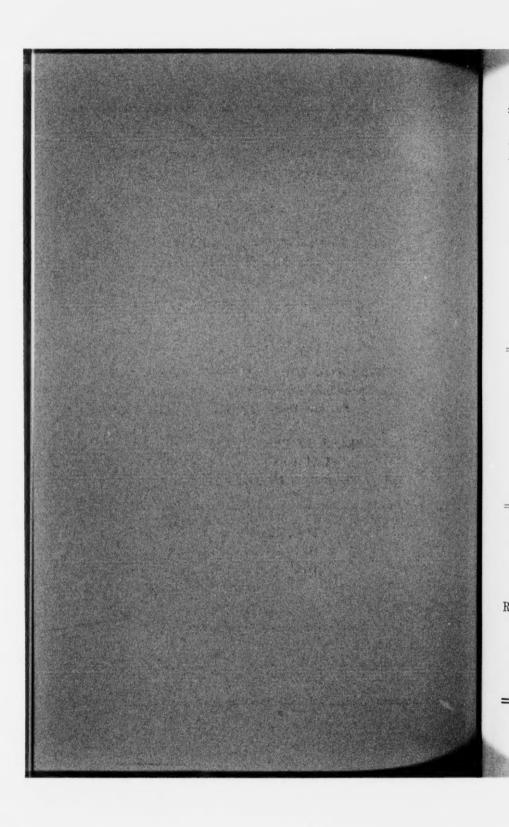
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In the Supreme Court of the United States OCTOBER TERM, 1942.

No.

THE SWAN CARBURETOR COMPANY, $Petitioner\ and\ Appellant\ Below,$

VS.

CHRYSLER CORPORATION, Respondent and Appellee Below.

PETITION FOR WRIT OF CERTIORARI
To the United States Circuit Court of Appeals
For the Sixth Circuit
and

BRIEF OF PETITIONER
WITH APPENDIX

(Reproduced from Physical Exhibits).

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In the Supreme Court of the United States OCTOBER TERM, 1942.

No.

THE SWAN CARBURETOR COMPANY, Petitioner and Appellant Below,

VS.

CHRYSLER CORPORATION, Respondent and Appellee Below.

PETITION FOR WRIT OF CERTIORARI To the United States Circuit Court of Appeals For the Sixth Circuit.

To the Honorable Harlan Fiske Stone, Chief Justice of the United States, and the Associate Justices of the Supreme Court of the United States:

Your petitioner respectfully shows:

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SUMMARY STATEMENT OF THE MATTER INVOLVED.

The above entitled suit is part of extensive litigation involving the Swan patent, No. 1,536,044 (R. Vol. IV, p. 1199). The decision of the Sixth Circuit Court of Appeals sought to be reviewed is reported in 130 Fed. (2d) 391, and is found at page 1851, Vol. V of the record. The findings and conclusions of the District Court in the instant case are reported at 34 Fed. Supp. 766 and are also found at page 1822, Vol. V of the record. Two patents were in suit below. Review is sought only of the portion of the decision dealing with the basic patent, No. 1,536,044.

Further reported cases in which this patent has been involved are: Swan v. General Motors, 42 Fed. (2d) 452

(D. C. N. D. Ohio, Westenhaver, J.); General Motors v. Swan, 44 Fed. (2d), 24 (C. C. A. 6), certiorari denied 282 U. S. 897; General Motors v. Swan, Reeke-Nash v. Swan, 88 Fed. (2d) 876 (C. C. A. 6), certiorari denied 302 U. S. 691; Swan v. Nash, 25 Fed. Supp. 21 (D. C. Md., Coleman, J.); Swan v. Nash, 25 Fed. Supp. 24 (D. C. Md., Coleman, J.); Swan v. Nash, 98 Fed. (2d) 115 (C. C. A. 4); Nash v. Swan, 105 Fed. (2d) 305 (C. C. A. 4); Swan v. General Motors, 43 Fed. Supp. 499 (D. C. N. D. Ohio, Nevin, J.).

Unreported decisions involving this patent are the report of the Commissioner in Swan v. General Motors (R. Vol. IV, pp. 1375 to 1472 inc.); and the report of the Special Master in the Reeke-Nash case (II R. N. pp. 1101 to 1163; Appendix pp. 1-62),* whose findings and conclusions were adopted by the District Court (R. Vol. I, p. 19). The testimony and exhibits in the Reeke-Nash case which were re-offered in this case were not reproduced. For the convenience of the Court the Master's report is reproduced as an Appendix to this Petition.

Suits are pending in the Fourth and Sixth Circuits,

one of which is yet awaiting trial.

During this litigation, extending for the last sixteen years through these numerous cases in the Fourth and Sixth Circuits, there have arisen many questions which should be settled by this Court, including some in which the Fourth and Sixth Circuits are in conflict, as is plain from the following statement by Judge Parker in a dissenting opinion in the Nash-Swan case (105 Fed. (2d) 311):

"The finding of non-infringement (by the majority of the court) is in direct conflict with a finding in one of the last General Motors cases affirmed by the Sixth Circuit, 88 F. 2d 876;"

^{*} We will refer to the record in the instant case as (R. Vol. ..., p. ...). The five volumes of the Reeke-Nash record are Plaintiff's Exhibits 27 A to E inc., and we will refer to the volume and page as (.... R. N. p.).

and many questions on which Masters, District Courts, Courts of Appeals are in conflict as we point out, post.

In the General Motors litigation the patent in suit has been held uniformly to cover manifolds comparable to the accused manifolds in this case.

In the Recke-Nash case all of the claims here in suit were held valid and infringed by the Special Master, whose findings were adopted by the District Court (Appendix, post; R. Vol. I, p. 19). The District Court in the instant case held that Respondent is in privity with the Reeke-Nash Company by reason of the defense of that case by the National Automobile Chamber of Commerce, of which respondent was and is a member (R. Vol. I, p. 132; Vol. V, p. 1822).

On appeal of the *Reeke-Nash* case the Sixth Circuit Court of Appeals (88 Fed. (2d) 876) affirmed the District Court as to certain of the claims of the patents, held that these claims were sufficiently broad to give petitioner all the relief it was seeking, and did not act upon the defendant's request that the decree be reversed as to the remaining claims.

In the instant suit the District Court found none of the claims invalid. The court concluded that the patent in suit had not been infringed. The Court of Appeals held claims 4, 5, 8, 9, 10, and 22 to be invalid, and did not affirm the holding of non-infringement of these claims; and held claims 13 and 23 not infringed for somewhat different reasons than those given by the District Court.

QUESTIONS INVOLVED.

1. Whether a prior art device, which has proven a failure, which was faulty, and which did not perform according to the principle of the patent in suit, may be modified to change its mode of operation and results and as so modified used to place a limitation upon the claims of the patent in suit.

- 2. Whether, under the doctrine of res judicata, the validity of certain patent claims adjudicated by a final decree can be re-litigated in a second suit between the parties or their privies, where the defendant in the first case, on appeal from the final decree, failed to obtain a reversal, and the Court of Appeals affirmed as to some of the claims and dismissed without prejudice as to the remainder on the ground that plaintiff's recovery would be the same no matter how many claims it was based on.
- 3. (a) Whether a method involving the application to a fluid of the natural forces of gas pressure, inertia and reaction is a method consisting entirely of mechanical transactions which may be said to be the mere function of an apparatus suitable for carrying out the method.
- (b) Whether or not claims drawn to a method including steps of applying forces to a fuel mixture to move the same in certain directions and in specified manners are invalid for indefiniteness because the claims do not state what the forces are nor how they operate, where the invention consists in the direction and manner of movement imparted to the fuel mixture, not in what the forces are nor how they operate.
- 4. Whether a claim to a combination of elements which is otherwise valid is rendered invalid by the addition of an explanatory clause reciting the function of a specified element of the combination.
- 5. Whether or not the invention of the Swan patent No. 1,536,044 is a pioneer invention entitled to the broad range of equivalents accorded to patents on pioneer inventions.
- 6. Whether the fact findings of the Special Master, adopted by the District Court in a prior suit against a privy of respondent, are entitled to the weight and credit provided by Rule 52, Rules of Civil Procedure, on issues of fact on which the District Court in the instant case made no findings or rulings.

REASONS RELIED UPON FOR THE ALLOWANCE OF THE WRIT.

1. (a) The courts below are in hopeless conflict on the status of certain prior art manifolds, including the Matheson manifold. The Sixth Circuit Court of Appeals held in the *Reeke-Nash* suit, against a privy of respondent, 88 Fed. (2d) 876, pages 886 to 887:

"The Murray and Tregurtha manifold has heretofore been discussed in the royalty case. It did not perform according to the Swan principle, and its distribution was faulty. This is equally true of Matheson, Peerless and Fay & Bowen, which must rank as prior efforts and failures."

This has been followed by other courts in the following cases:

Judge Coleman, in Swan v. Nash, 25 Fed. Supp. 24; Judge Parker, dissenting opinion in Nash v. Swan, 105 Fed. (2d) 305; and Judge Nevin, in Swan v. General Motors, 43 Fed. Supp. 499. To the same effect were the prior decisions of Judge Westenhaver, in Swan v. General Motors, 42 Fed. (2d) 452, and the decisions of the Master and District Court in Swan v. Reeke-Nash, II R. N. 1101, R. Vol. 1, page 19, and Swan v. General Motors, R. Vol. IV, page 1375.

The Fourth Circuit Court of Appeals in Swan v. Nash, 105 Fed. (2d) 305 differed with this holding, as is clear from the following from the dissenting opinion of JUDGE PARKER (105 Fed. (2d) 311):

"The finding of non-infringement (by the majority of the court) is in direct conflict with a finding in one of the last General Motors cases affirmed by the Sixth Circuit, 88 F. 2d 876:"

JUDGE PARKER'S dissent was in accordance with the District Court in Maryland (COLEMAN) and the views of the neutral expert appointed by him.

(b) The court below said, R. Vol. 5, page 1856:

"Since appellee does not claim that Matheson and Fiat anticipate Swan, but merely that appellee follows Matheson and Fiat rather than Swan, the authorities urged upon us to the effect that an improved prior art cannot under the decisions be held to anticipate Swan, have no bearing."

In permitting modifications of the prior art to qualify or limit petitioner's patent claims the court below is in direct conflict with the rulings of the Second Circuit Court of Appeals in Babcock v. Springfield (16 Fed. (2d) 964, 969) and Consolidated v. Window, 261 Fed. 362, 368 to 369; and in direct conflict with the ruling of the Eighth Circuit Court of Appeals in Goessling v. Gumb, 241 Fed. 674.

- (c) The holding of non-infringement by the Sixth Circuit Court of Appeals in the instant case is in conflict with the findings of the neutral expert in the Fourth Circuit case, with the Jury in one of the Sixth Circuit cases, and with the two Masters and one District Judge who saw tests of comparable manifolds and heard the witnesses.
- (d) The Sixth Circuit Court of Appeals, in accepting the findings made by the District Court in this case, who did not see the tests, as to what happens inside the manifolds, as against the contrary findings of a District Judge, two Masters, and a neutral expert who actually watched the operations of comparable manifolds in other cases, is at variance with the Circuit Courts of Appeals for the Second and Ninth Circuits (Stevens v. Schmid, 73 Fed. (2d) 54, C. C. A. 2; Diamond v. Webster, 249 Fed. 155, C. C. A. 9) as to the weight to be given to findings based on actual observation of tests.
- (e) There is diversity of decision with respect to the effects and operations of the hot spot heating devices between the decision of the Sixth Circuit Court of Appeals in the instant case, on the one hand, the neutral expert, the District Judge and the Court of Appeals in the Fourth

Circuit, the Master and District Judge in the case of Swan v. Reeke-Nash, the Jury in the case of Swan v. General Motors and with the Master and the District Judge in the case of Swan v. General Motors, on the other hand.

- 2. The Sixth Circuit Court of Appeals, in deciding that respondent is not estopped to contest validity of the claims held valid in a final decree against a privy of respondent where such privy failed to obtain a reversal of that decree on appeal, has decided an important question of law not heretofore passed on by this Court in a manner which is probably in conflict with the applicable decisions of this Court.
- 3. (a) The Sixth Circuit Court of Appeals, in holding the method claims 4, 5, 8, 9, and 10 in suit invalid on technical grounds, differed with the Master and the District Court who held these claims valid in Swan v. Reeke-Nash (R. Vol. I, page 19, and Appendix, post). The District Court in the instant case did not find any of these claims invalid. The form of these claims, which is the basis of the holding of invalidity, was suggested by the Patent Office (IV R. N. 2063), and claim 4 was one of the counts of an interference declared by the Patent Office (IV R. N. 2083-2084) in which priority was awarded to Swan (Deft's. Ex. 141A).
- (b) The decision of the Sixth Circuit Court of Appeals that the method claims in suit, covering the moving of the mixture in certain manners and directions by the application of natural forces, are merely for the function of a machine, is in conflict with the generally accepted interpretation of this Court's decisions in Cochrane v. Deener, 94 U. S. 780, Eames v. Andrews, 122 U. S. 40, and Fermentation Co. v. Maus, 122 U. S. 413, that methods involving the employment of pneumatics, hydraulics, and other natural forces are patentable subject matter, as distinguished from methods consisting solely of mechanical transactions, which are patentable only if they can be carried out by

other machines, or by hand, as held by this Court in Expanded Metal v. Bradford, 214 U. S. 366.

- (c) In ruling that the method claims in suit are invalid for indefiniteness under this Court's decision in General Electric v. Wabash, 304 U. S. 364, the Sixth Circuit Court of Appeals has erroneously extended the rule of the cited case beyond its stated and logical limits, in a manner probably in conflict with the decisions of this Court applicable to method claims. In the cited case the claims were held to be bad for failing to include the tangible characteristics of the article. A claim to a method, which is inherently intangible, must be tested by different rules.
- 4. The ruling of the Sixth Circuit Court of Appeals that claim 22 is invalid as functional because one element of the combination is defined in functional terms is in conflict with the rule followed in the Second and Seventh Circuit Courts of Appeals.
- 5. The courts below are in conflict as to whether or not the Swan patent No. 1,536,044 is for a pioneer or primary invention, and thus differ as to the range of equivalents to which the patent is entitled.
- 6. The Court of Appeals for the Sixth Circuit, in holding claims 4, 5, 8, 9, 10 and 22 invalid on technical grounds, ignored the findings of the Special Master, adopted by the District Court, in Swan v. Reeke-Nash, that these claims are valid as against these same defenses, contrary to the provisions of Rule 52, Rules of Civil Procedure, there being no finding on these issues by the District Court in the instant case.

Wherefore, your petitioner prays that a writ of certiorari issue to the United States Circuit Court of Appeals for the Sixth Circuit, commanding said court to certify and send to this Court on a day to be designated, a full and complete transcript of the record of all the proceedings of the Circuit Court of Appeals had in this cause, to the end

that this cause may be reviewed and determined by this Court; that the judgment of the Circuit Court of Appeals as to patent No. 1,536,044, holding claims 4, 5, 8, 9, 10 and 22 invalid and claims 13 and 23 not infringed be reversed; and that the petitioner be granted such other and further relief as may seem proper.

THE SWAN CARBURETOR COMPANY,

Petitioner,

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In the Supreme Court of the United States OCTOBER TERM. 1942.

No.

THE SWAN CARBURETOR COMPANY, Petitioner and Appellant Below,

VS.

CHRYSLER CORPORATION,
Respondent and Appellee Below.

BRIEF IN SUPPORT OF PETITION.

I.

The Opinions of the Courts Below.

The opinion in the Sixth Circuit Court of Appeals is reported in *The Swan Carburetor Company v. Chrysler Corporation*, 130 Fed. (2d) 391 (advance sheets) and is found at R. Vol. V, p. 1851. The findings and conclusions of the District Court are reported in 34 Fed. Supp. 766 and are found at R. Vol. V, p. 1822.

II. Jurisdiction.

Petitioners would invoke the jurisdiction of this Court under 28 U. S. C. 347 (Sec. 240 (a) of the judicial code as amended by the act of February 13, 1925). The decree of the Sixth Circuit Court of Appeals was entered June 29, 1942 (R. Vol. V, page 1851). A petition for rehearing was denied October 6, 1942 (R. Vol. V, page 1903). This petition is presented within three months from and after the denial of the petition for rehearing. This case is a suit for patent infringement brought under 28 U. S. C. 109; the decree below dismisses the Bill of Complaint (R. Vol. V, pages 1832, 1851).

III.

Statement of the Case.

A sufficient statement of the case, so far as the questions involved and the reasons relied upon are concerned, is contained in the petition under the heading "Summary Statement of the Matter Involved."

IV.

Specification of Errors.

The Sixth Circuit Court of Appeals erred:

- (1) In holding that the prior art may be modified to change its mode of operation and results and used to place a limitation upon the claims of the patent in suit.
- (2) In permitting respondent to re-litigate the issue of validity of claims 4, 5, 8, 9, 10 and 22 held valid in an unreversed decree against a privy of respondent.
- (3) In holding that the method defined in claims 4, 5, 8, 9 and 10 is a method "consisting entirely of mechanical transactions."
- (4) In holding that the method claims 4, 5, 8, 9 and 10 are invalid for indefiniteness in not stating what the forces are nor how they operated.
- (5) In holding that claim 22 is invalid because one of the elements of the combination is defined in functional terms.
- (6) In failing to hold that the invention of patent No. 1,536,044 is a pioneer invention entitled to a broad range of equivalents.
- (7) In failing to give to the findings of fact of the Special Master in the *Reeke-Nash* case, which were adopted by the District Court, the weight and credit to which they are entitled under Rule 52, Rules of Civil Procedure.

V.

Summary of the Argument.

Point A. There is conflict between the various courts below as to whether the prior art may be modified to limit or defeat the patent.

Point B. The decision of the Sixth Circuit Court of Appeals that the prior art may be modified and then used to impose a limitation on the patent in suit is in conflict with the decisions of the Second Circuit Court of Appeals in Babcock v. Springfield, 16 Fed. (2d) 964 and Consolidated v. Window, 261 Fed. 362, and in conflict with the Eighth Circuit Court of Appeals, Goessling v. Gumb, 241 Fed. 674.

Point C. The holding of non-infringement by the court below is in conflict with the fact findings of a neutral expert, a jury, two masters and one district judge who saw tests of comparable manifolds.

Point D. The Sixth Circuit Court of Appeals is at variance with the Second Circuit Court of Appeals in Stevens v. Schmid, 73 Fed. (2d) 54, and the Ninth Circuit Court of Appeals in Diamond v. Webster, 249 Fed. 155, as to the weight to be given to findings based on actual observation of tests.

Point E. The decision of the Sixth Circuit Court of Appeals as to the effect and operation of the hot spot heating device is in conflict with the findings and decision in all of the other suits on the Swan patent No. 1,536,044.

Point F. The ruling of the Sixth Circuit Court of Appeals permitting respondent to re-litigate the issue of validity of claims 4, 5, 8, 9 and 10, held valid in an unreversed decree against a privy of respondent, is in conflict with the fundamental purpose of the doctrine of res judicata and with the reasoning of this Court in City of Aurora v. West, 7 Wall. 82 and Durant v. Essex, 7 Wall. 107.

- **Point G.** The Sixth Circuit Court of Appeals, in holding claims 4, 5, 8, 9, 10 and 22 invalid because of their form differed with the decision of the master and the District Court holding these claims valid in the *Reeke-Nash* case, and with the Patent Office which suggested the form of the claims.
- Point H. The decision of the Sixth Circuit Court of Appeals that the method claims in suit consist solely of mechanical transactions and are merely for the function of a machine is in conflict with this Court's decisions in Cochrane v. Deener, 94 U. S. 780; Eames v. Andrews, 122 U. S. 40; and Fermentation v. Maus, 122 U. S. 413.
- **Point I.** The decision of the court below that the method claims in suit are invalid for indefiniteness is an erroneous extension of this Court's decision in *General Electric v. Wabash*, 304 U. S. 364, and in conflict with other decisions of this Court sustaining similar method claims.
- **Point J.** The ruling of the Sixth Circuit Court of Appeals that claim 22 is invalid because one element is defined in functional terms is in conflict with the rule followed in the Second and Seventh Circuit Courts of Appeals.
- **Point K.** The courts below are in conflict as to whether or not patent No. 1,536,044 is for a pioneer or primary invention.
- **Point L.** The failure of the Court of Appeals in this case to accord any weight to the findings in the *Reeke-Nash* case on the same issues against a privy of defendant is an erroneous interpretation of Rule 52, Rules of Civil Procedure.

ARGUMENT.

The importance of the invention covered by the Swan patent No. 1,536,044 in suit is attested by the fact that already it has been in litigation for sixteen years. The magnitude of the fight that has been waged to defeat the patentee by the gigantic patent pool, the National Automobile Chamber of Commerce, and its members, as well as the evils which result from failure to adhere strictly to the rules of res judicata, are shown by the fact that the record in this case consists of five volumes of new testimony and exhibits plus the five volumes of record in the Reeke-Nash case (Plaintiff's Exhibits 27A to E, inclusive) most of which was re-offered in this case, plus two volumes of the record in the Fourth Circuit case, Swan v. Nash, Defendant's Exhibits 93 and 93A, much of which was re-offered in this case.

It is inevitable in such extensive litigation that many differences would arise between the various tribunals. One of these differences, on which the decision of the court below is believed to constitute an erroneous and dangerous precedent, is the question of law as to whether or not the prior art may be modified to change its operations and results and used to limit or defeat the patentee.

POINT A.

The conflict between the courts below in ruling on this question is shown by the following excerpts:

The Special Master in Swan v. Reeke-Nash held (Appendix, pp. 54-55, II R. N. 1154-1155):

"The Fiat manifold (Defendant's Ex. 272) with the testimony of Rowan (Trans. 1480-81, 1490) shows efforts to correct fuel distribution, failure, and that the Italian experts were called to remedy trouble with the manifold, which efforts were unsuccessful. The most that can be said for the Fiat manifold is that, as

modified by the witness, it can only rate as one of several prior efforts and failures to do what Swan did.*

The Matheson manifold is also one of the 76 manifolds illustrated in the Tice article in which he says that they fail to effect equal distribution, and commented upon the inability of the devices of the then existing manifold art to equally distribute the fuel mixture. The faults of the Matheson manifold were testified to by several witnesses. * * * The Matheson manifold, like the others, must rate as a prior effort and failure instead of a device anticipating the Swan invention."

In affirming, the Sixth Circuit Court of Appeals held, 88 Fed. (2) 886:

"The Murray and Tregurtha manifold has heretofore been discussed in the royalty case. It did not perform according to the Swan principle, and its distribution was faulty. This is equally true of Matheson, Peerless and Fay & Bowen, which must rank as prior efforts and failures."

These findings are not contested by respondent and, in any event, are binding under the doctrine of res judicata. The neutral expert appointed by the District Court in the Fourth Circuit case agreed that Matheson failed to achieve Swan's results, but concluded that it could have been made to do so by modification to increase the mixture velocity and incorporate Swan's mode of operation.

Judge Coleman in the District Court in Baltimore refused to accept the evidence of what might have been done in the light of Swan's invention as modifying the proof of the actual failure of the prior art. He said, in Swan v. Nash, 25 Fed. Supp. 24, 30, 34:

"when we turn to the matter of results, Professor Christie, whose testimony, especially on this phase of the case, is believed to be of great probative weight

^{*} Emphasis ours throughout.

because he testified without the slightest bias that might attend an advocate, stated that he thought substantially the same results would have been obtained as were obtained with the Nash accused device, had the Matheson device, constructed precisely as known to the courts in the previous litigation, been capable of operation with substantially the same velocities and the same rates of flow, and had it been so operated. However, this is a speculation, not even an asserted, much less an established, fact. * * *

This coincides with the proof as to Matheson that has been adduced in the present case, because, just as in the previous litigation, there is no proof that Matheson's device as constructed and used at the time Swan conceived and patented his device, was in fact other than an unsuccessful effort at equal distribution as then and still understood, notwithstanding speculative evidence to the contrary as a result of tests made upon so called Matheson devices of definitely modified design. Clearly, such unsuccessful effort is not anticipation, as understood in the patent law. If it were, an inventor's success would no longer be 'his title to consideration.' See Diamond Rubber Company v. Consolidated Rubber Tire Co., supra, page 437, 31 S. Ct. 444."

The majority of the Court of Appeals in the Fourth Circuit accepted the evidence of the success of present day modifications as overcoming the failure of the actual prior art device. They said in Nash v. Swan, 105 Fed. (2) 305, 310:

"The evidence before us does not justify the finding that the Matheson manifold was a prior effort and failure. The performance of the second Nash manifold is proof to the contrary."

Judge Parker in his dissenting opinion in that case said, page 311:

"The finding of non-infringement is in direct conflict with a finding in one of the last General Motors cases affirmed by the Sixth Circuit, 88 F. 2d 876; and its effect is that, while paying lip service to the validity of the patent, we in effect nullify it, and do so on the basis of the supposed resemblance of the accused device to a structure in the prior art, which had proven a failure and over which the device of the patent in suit had made an improvement of great value. With all respect to the opinion of my brethren, I feel constrained to dissent from their decision."

The Sixth Circuit Court of Appeals, in the instant case, while recognizing that the prior art may not be reconstructed in the light of the Swan invention to make out an anticipation, accepted the evidence of the modified Matheson and Fiat devices as justifying infringement. That court said (R. Vol. V, p. 1856):

"Since appellee does not claim that Matheson and Fiat anticipate Swan, but merely that appellee follows Matheson and Fiat rather than Swan, the authorities urged upon us to the effect that an improved prior art cannot under the decisions be held to anticipate Swan, have no bearing."

In Swan v. General Motors, 43 Fed. Supp. 499, Judge Nevin refused to accept the evidence of the operation and results of present day modifications of the prior art devices as limiting petitioner's claims or justifying infringement. He said, page 503:

"Plaintiff further urges that the Special Master has, by his findings and rulings, in effect, found that the same prior art, which was found to be failure in the prior actions, can be taken in this action to be successful, i.e. to substantially equal Swan and the 'other accused' manifolds in purpose, accomplishment and results, * * *

Upon the record, the court feels bound to conclude that plaintiff is right in its contention, and that the Special Master has erroneously given all the attributes of success to the same prior art devices which have been heretofore adjudged to be failures. Plaintiff says in its brief: 'Every ruling against the plaintiff is predicated upon the cardinal error of disregarding the controlling findings in the prior actions, and thereby employing "prior effort and failure" to force limitations, newly conceived by the Master, into Swan's patent claims, where they did and do not exist, all in order to spell out "non-infringement" herein. Such is not the law," (citing) Diamond Rubber Co. v. Consolidated Rubber Tire Co., 220 U. S. 428, 431, 31 S. Ct. 444, 55 L. Ed. 527; Keystone Mfg. Co. v. Adams, 151 U. S. 139, 14 S. Ct. 295, 38 L. Ed. 103; Consolidated Window Glass Co. v. Window Glass Mach. Co., 3 Cir., 261 F. 362. With the foregoing statement the court agrees."

The General Motors Corporation has settled with Petitioner and obtained a paid up license, so that the foregoing decision is final in the *General Motors* litigation.

To summarize, the courts in the Sixth Circuit in all the General Motors cases and in the Reeke-Nash case have held that the prior art must be considered as it existed and was used prior to the invention of the patent in suit. is no dispute that the prior art so considered was faulty in distribution and failed to solve the wet mixture problem which is solved by the patent in suit. The majority of the Court of Appeals in the Fourth Circuit held that the proof as to the actual failure of the prior art could be overcome by proof of successful operation of present day modifications. The District Court in Baltimore and the dissenting circuit judge held the contrary. In the instant case the Sixth Circuit Court of Appeals did not fellow the majority in the Fourth Circuit and adhered to their former view that the prior art, exemplified by Matheson and Fiat, was a failure in the effort to solve the wet mixture problem. However, the Court of Appeals in the instant case permitted the respondent to modify the prior art to impose a limitation on the patent in suit and thereby escape infringement, distinguishing from the decisions of this Court refusing to permit such modification of the prior art on

the ground that the modified art was not being urged to anticipate. Judge Nevin in the last General Motors decision, which has terminated that litigation, refused to follow this rule, accepting instead the rule in the Second and Eighth Circuits that the prior art may not be modified either for anticipation or to impose a limitation on the patent in suit.

POINT B.

The Sixth Circuit Court of Appeals agreed with the established rule that the prior art cannot be modified in the light of the invention of the patent in suit to make out an anticipation, but held that the respondent could modify the prior art and compare the accused device with the modified prior art, or in other words that modifiention is permissible to impose a limitation on the patent in suit.

This ruling is directly contrary to the rulings of the Second Circuit Court of Appeals and the Eighth Circuit

Court of Appeals.

In Babcock v. Springfield, 16 Fed. (2) 964 the Court of Appeals for the Second Circuit said (p. 969):

"Prior patents, none of which solved the problem, can have no effect in anticipating, qualifying, or defeating the claims for patent protection of those whose subsequent effort produced success. Consolidated Window Glass Co. v. Window Glass Machine Co. (C. C. A.) 261 F. 362."

In Consolidated v. Window, 261 Fed. 362 the same Court said (pp. 368-369):

"It follows, also, that these prior patents, none of which solved the problem of machine-drawn window glass, should have no effect in anticipating, qualifying, or defeating the claims for patent protection of those whose subsequent effort actually produced machine-drawn window glass. Nor should these earlier, but abortive, attempts which resulted in absolutely nothing, shield and protect from infringement and accounting those who copied not the abortive failures, but the successful steps of the originators of machine-drawn glass."

In Goessling v. Gumb, 241 Fed. 674, the Court of Appeals in the Eighth Circuit said (p. 677):

"A mechanical device or combination, which was not designed by its maker, nor actually used, nor apparently adapted to perform the function of a patented device or combination, but which was discovered in a remote art, where it was conceived and used under radically different circumstances to perform another function, neither anticipates nor limits the scope of the patent. Ansonia Brass & Copper Co. v. Electrical Supply Co., 144 U. S. 11, 18, 12 Sup. Ct. 601, 36 L. Ed. 327; Topliff v. Topliff, 145 U. S. 156, 161, 12 Sup. Ct. 825, 36 L. Ed. 658; Potts v. Creager, 155 U. S. 597, 608, 15 Sup. Ct. 194, 39 L. Ed. 275; National Hollow Brake-Beam Co. v. Interchangeable Brake-Beam Co., 106 Fed. 693, 702, 45 C. C. A. 544, 553."

The changes permitted are (R. Vol. II, p. 736, Vol. III, pp. 916-921, 927, 930-931, 984-985):

Original Matheson.

Defendant's solid and window reproductions thereof. Used on Matheson engine.

- 1. Goose neck carburetor and erratic curved presentation of mixture to and through the riser.
- 2. Flared asymmetrical riser top in updraft form causes slowing down of mixture, falling back of liquid and running down curved walls. Gravity opposes lifting of liquid into zone against low mixture speed.
- 3. Low velocities and large radii.

Modified Matheson.

Defendant's Ex. 101. Used on 1940 Plymouth Automobile.

- 1. Straight carburetor throat and riser and straight line movement of the mixture in the riser toward center zone.
- 2. In downdraft form gravity aids movement of liquid toward zone in conjunction with higher mixture speed.
- 3. Velocity increased and radius decreased from original Matheson.

- 4. V²R insufficient to prevent "cream separator" effect with liquid particles favoring one cylinder or one end of the header more than the other.
- 5. Branches are shorter than the diameter and short relative to the radius of the adjoining curve.
- Lower ratio of surface area to volume in manifold of very large volume and surface area.
- 7. Large total surface area will delay accelerations of liquid fuel.
- 8. Walls opposite riser and middle branch non-recessed.
- 9. Poor accelerations and very uneven running and backfires when accelerating both with and without heat applied to the manifold. Full sized Matheson manifold definitely inferior to Swan (Ex. 183) in power and economy (Ex. 185).
- 10. Branches do not register with cylinder ports, but are larger, so that velocity in manifold is less than normal mixture velocity through engine ports.

- 4. V²R at all turns is greatly increased causing remixing of liquid and gaseous parts of mixture as distinguished from "cream separator" effect.
- 5. Branches are long relative to diameter and radius of adjoining corner.
- 6. Ratio of surface area to volume is larger and helps scrubbing action and vaporization of wall liquid and helps move wall liquid relatively faster in smaller manifold.
- 7. Small total surface area requires less liquid to wet the walls on accelerations.
- 8. Walls opposite riser and middle branch recessed slightly as in accused and preferred form of Swan.
- 9. Good performance on the road through quite a large range of mixture temperatures and speeds when tested on defendant's road tests.
- 10. Branches register with intake ports as disclosed in Swan specification and claim so that maximum mixture velocity is maintained in the manifold.

POINT C.

The Sixth Circuit Court of Appeals correctly stated the issue on infringement to be (R. Vol. V, p. 1856):

"Nor does the presence of liquid fuel in appellee's fuel mixture at certain times establish infringement as contended.* The controlling question is whether appellee's devices equally distribute the fuel mixture by use of the Swan invention."

As to claim 13, the decision of the Court of Appeals is that the distributing chambers in respondent's manifolds, formed by walls whose intersections form lines straight in one plane but curved in another (because the passages are round instead of square in cross-section) do not come within the limitation to "a distributing chamber formed of walls the intersections of which form straight lines," which is one of the elements of the combination claimed. As to claim 23, the decision below is that the limitation to "outlet branches being angularly formed to register with the intakes of pairs of cylinders" which is one of the elements of the combination of this claim, must be limited to angular formations which are sharp on the inside corners.

In these rulings the Court of Appeals differs with all of the other tribunals which have ruled upon these claims. The Special Master, Mr. Woods, in *Swan v. Reeke-Nash* held (II R. N. 1119; Appendix, p. 19):

"Such differences in structure, as may be found to exist in one or more of defendant's manifolds as compared with the preferred form of the patented manifold by reason of defendant's use of round construction as distinguished from square construction, or by reason of defendant's use of slightly rounded inside corners instead of sharp right angle inside corners, or

^{*} It was not our contention that the fact that liquid fuel is distributed by respondent's manifolds establishes infringement, but that this fact disposes of the District Court's holding of non-infringement.

by reason of defendant's use of curved or partly curved walls at the ends of the header and opposite the riser, are immaterial in that such departures as defendant has made in the structure of its manifolds, here charged to infringe, do not effect any substantial or material difference in function, mode of operation, or results in such manifolds as compared with the patented manifolds or the preferred form of the patented manifolds, and such differences as may be found are immaterial in that the effect of such changes and the extent of such differences are merely in matter of degree and are not differences in kind or substance."

One of the manifolds held to infringe in Swan v. Reeke-Nash is illustrated in Fig. V of the chart at the back of this brief. The remainder are shown at III R. N. pp. 1339-1351, inc.

In *Reeke-Nash v. Swan*, 88 Fed. (2d) 876, the Court of Appeals of the Sixth Circuit said, page 887:

"It is true that claims 11, 12 and 13 of this patent describe 'walls the intersections of which form straight lines,' but the remaining claims are not thus restricted.

Whether or not patent No. 1,536,044 described a pioneer invention, as in effect held in the General Motors Case (42 F. (2d) 452), under the specifications, which are to be read with the claims, though they may not expand or limit them, Swan is entitled to a range of equivalents broad enough to cover appellant's manifolds. Cf. Bishop & Babcock Mfg. Co. v. Fulton Co., 37 F. (2d) 293 (C. C. A. 6). This is true even as to claims 11, 12 and 13, in which, as in the other claims, the gist of the inventive concept was the creation of the maximum turbulence as above described, not restricted to any particular form. Cf. United Shoe Machinery Corp. v. O'Donnell Rubber Products Co., 84 F. (2d) 383 (C. C. A. 6)."

This same question as to whether the departure of the wall intersections in the distributing chamber form straight lines, due to the use of round passages, avoided infringement was decided in the negative by Judge Westenhaver

in Swan v. General Motors, 42 Fed. (2d) 452, and by the jury in the second General Motors case (see 88 Fed. (2d) 883). These same issues were submitted to and decided by a commissioner before submission to the jury in the second General Motors case. The commissioner's report holding that manifolds with round cross sections and rounded end bends infringe is reproduced in R. Vol. IV, pages 1375 to 1472, inclusive. Two of the manifolds held to infringe by the commissioner and the jury are illustrated in Figs. II and III in the chart at the back of this brief.

The neutral expert and the District Court in Swan v. Nash also held that such structural modifications which do not change the operations or results do not avoid infringement. The District Court said, 25 Fed. Supp. 31 to 32:

"Second, the top of the chamber over the riser in all of the varieties of the Nash accused devices is also like Matheson, namely rounded; and, also like Matheson, those varieties have wide or rounded curves at the bottom of the two right and left exits from this chamber, but have a sharper curve into the center branch or outlet, as opposed to a sharp corner at the bottom of all three exits of the chamber in the Nash adjudicated device; and in at least some of the adjucated devices the tops of this chamber are of different construction. We adopt Professor Christie's view that such features are rather inconsequential variations and such as are permissible under the Swan patent."

Judge Nevin, in Swan v. General Motors, 43 Fed. Supp. 499, affirmed the finding of the master in that case that the manifold shown in Fig. IV of the chart at the end of this brief infringes the patent in suit.

POINT D.

The Sixth Circuit Court of Appeals held (R. Vol. V, p. 1854):

"We think that under this record the court's absence from the tests in no way impairs the validity of its conclusions as to their significance. Since both parties admit that substantially identical performance was secured under all the *inter partes* tests,* and since the District Court's findings emphasized this fact, the circumstance that the District Court was absent when the tests were conducted is immaterial."

The Court of Appeals recognized, however (R. Vol. V. p. 1856):

"The controlling question is whether appellee's devices equally distribute the fuel mixture by use of the Swan invention."

Thus this branch of the issue of infringement was determinable by observation of the tests.

Petitioner urged upon the Court of Appeals the findings of the Special Master in the Reeke-Nash case (Appendix, p. 12) of Judge Westenhaver in Swan v. General Motors, 42 Fed. 452, and the neutral expert in Swan v. Nash, 25 Fed. Supp. 24, all based upon actual observation of tests of comparable manifolds. The Court of Appeals accorded no weight to these findings.

^{*}This is correct only as to the comparisons made at each test. It is agreed that the accused manifolds, the Swan manifold, and the adjudicated Reeke-Nash manifolds gave identical results when compared. Respondent's tests showed identical results between the accused manifolds and the modified prior art in one comparison, and in another comparison, similar results between the original prior art and an *impaired* Swan manifold. But petitioner did not, and does not, agree that the results in these two latter sets of tests were the same. The accused and the modified prior art manifolds showed equal distribution; the original prior art and the impaired Swan showed unequal distribution.

In Stevens v. Schmid, 73 Fed. (2d) 54, the Second Circuit Court of Appeals said, p. 55:

"The District Judge saw the defendant operate a model of the Hadfield machine and stated that it did not produce a satisfactory bead. On such a question his finding is entitled to full weight."

In *Diamond v. Webster*, 249 Fed. 155, the Ninth Circuit Court of Appeals said, p. 158:

"In such a case, the trial court having the advantage of seeing and especially examining the material which it is claimed infringes, an appellate court, without such advantage, will not disturb the conclusion reached, unless it appears clearly that the finding is against the obvious weight of the testimony."

See also

Reinharts vs. Caterpillar, 85 Fed. (2) 628, 630, C. C. A. 9;

Wilkie vs. Santly, 91 Fed. (2) 978, 979-980, C. C. A. 2.

POINT E.

The diversity of decision of the courts below with respect to the "hot spot" is illustrated by Figs. 1 to 5, inclusive, in the chart at the end of this brief. Fig. 1 shows a specimen of the accused manifolds, the hot spot being indicated in red. This is merely a jacket around the center of the header of the manifold through which some of the exhaust gases of the engine are directed to supply heat to the mixture.

Figs. 2 and 3 show two of the forms of manifolds which were held to infringe the patents in suit by Mr. Woods as commissioner, R. Vol. IV, page 1375, and by the jury in the case affirmed by the Sixth Circuit Court of Appeals, *General Motors v. Swan* (88 Fed. (2d) 876). The hot spots are identical with the hot spot in the accused manifold.

Fig. 4 shows one of the forms of manifolds held to infringe by Judge Nevin, 43 Fed. Supp. 499. Again the hot spot is identical with the hot spot in the accused manifold.

Fig. 5 shows one of the forms of manifold held to infringe by the Special Master, Mr. Woods, in the *Reeke-Nash* case, whose findings were adopted by the District Court (R. Vol. I, p. 19) and affirmed by the Sixth Circuit Court of Appeals (88 Fed. (2d) 876).

The manifolds shown in each of Figs. II, III, IV, and V were held to infringe the patent in suit. In each instance the hot spots, the heat, its application and the manner of its use were identical with the accused manifolds. All were used on the same kind and type of engine and with the same fuel as the accused manifold.

In all of the other suits on the Swan patent the accused manifolds included heating means, such as hot spots and the like, and all of the other tribunals have differed with the Court of Appeals in the instant case as to the effect of these heating means. In Swan v. General Motors, 42 Fed. (2d) 452, Judge Westenhaver said, page 457:

"Defendant has adopted and uses a Marvel heater surrounding the riser. It contends that the mixture is completely vaporized while passing through this heated zone, and hence that the problem of mixing and vaporizing in the header and branches, which Swan sought to solve, is not only not involved, but is solved in another and different manner. " * *

Defendant, to support its contention that the mixture is thus fully vaporized by its Marvel heater, and that no wet mixture is left involving any problem of further vaporization or distribution, made a test in my presence at the White Motor plant of one of its engines. The results of this test did not carry full conviction. Admittedly, under certain conditions of starting and load and speed, the mixture was foggy and even wet. Moreover, the manifold and exhaust immediately became red hot, much beyond any temperature conditions to be expected in operation."

In Swan v. Reeke-Nash the Special Master stated one of the contentions of the defendant there to be (II R. N., pages 1144 to 1145; Appendix pages 44 to 45):

"That such equality of distribution as has been obtained by Swan has been due to the application of heat on the exhaust jacket which has produced evaporation in the riser, * * *"

At the same page he disposed of this contention from his own observation.

"The motion pictures show particles of the mixture striking the roof of the header opposite the riser (plaintiff's Exs. 117-123 incl.). Even if this be only a part of the mixture, yet it is in the method of the patent and is a phenomena described by Swan and one which has been shown in all tests heretofore made.

The stroboscopic demonstrations on the glass manifold at the White Plant showed the liquid particles hitting the roof of the header opposite the riser, and liquid particles were also seen hitting the roof of the header opposite the riser at the road demonstration, with a glass manifold on plaintiff's test car."

POINT F.

The doctrine of res judicata is a rule of fundamental and substantial justice. Litigants are entitled to their day in court and having had it they are foreclosed from imposing upon the courts the burden of re-litigating and redeciding the matters decided in the first case. In Hart Steel v. Railroad Supply Company, 244 U. S. 294, this Court said, page 299:

"This doctrine of res judicata is not a mere matter of practice or procedure inherited from a more technical time than ours. It is a rule of fundamental and substantial justice, 'of public policy and of private peace,' which should be cordially regarded and enforced by the courts to the end that rights once established by the final judgment of a court of competent jurisdiction shall be recognized by those who are bound

by it in every way, wherever the judgment is entitled to respect. Kessler v. Eldred, supra."

The final decree of April 30, 1934 against a privy of respondent (R. Vol. I, pages 19 to 21) adjudged, after full trial of all the issues before a Special Master and full review by the District Judge in concurring holdings, that claims 4, 5, 8, 9, 10, 13, 22 and 23 of patent No. 1,536,044, here in suit, are valid.

This final decree of April 30, 1934 cannot be collaterally attacked in the present case. The burden was on the appellant in the first case, The Reeke-Nash Company, to establish error in the decision below and obtain a contrary decision. The mere filing of an appeal is not such action as will suspend or revoke the operation of the judgment as an estoppel (Deposit Bank v. Frankfort, 191 U. S. 499, 510; Straus v. American Publishers' Assoc., 201 Fed. 306, 310). Likewise appeal proceedings which are never perfected do not deprive the judgment of its force as an estoppel (Hubbell v. United States, 171 U. S. 203, 210). The reason is the same in both instances: the parties have had their day in court, and the courts cannot be imposed upon to re-try the issues unless and until the appellant obtains a decision that the adjudication of the trial court was erroneous.

If all or part of the plaintiff's claim is dismissed without prejudice before trial the action is inconclusive and there is no estoppel, because there was no estoppel before and the inconclusive action does not change the pre-existing status.

In the instant case a new status between the parties was created by the final decree of April 30, 1934 adjudicating that all of claims 4, 5, 8, 9, 10, 13, 22 and 23 of patent No. 1,536,044 are valid. This adjudication became binding upon the defendant and its privies unless and until the defendant should, by appeal or proper proceedings in that case, obtain a new adjudication that the decision below was erroneous, which new adjudication in turn would conclude

both parties as to the issue decided. An inconclusive action which does not bind either party cannot create an estoppel and therefore such an action cannot diminish or destroy an estoppel already existing. Otherwise the salutary and necessary rule that parties can have but one day in court would be breached, and the door would be opened to endless litigation.

The Sixth Circuit Court of Appeals on defendant's appeal in the Reeke-Nash case affirmed the decree of April 30, 1934 as to part of the claims, and as to all of the relief sought by plaintiff, and made no decision with respect to the other claims of which the defendant complained in its appeal. The appellant was the moving party, seeking affirmative action, a reversal, and it failed to make its motion good on any issue. The Court of Appeals found no error whatever in the final decree of April 30, 1934. The Court said, 88 Fed. (2) 888:

"Appellant contends that the method claims of patent No. 1,536,044 are invalid because they describe merely the function of the manifold. Since as to infringement one royalty is appropriate compensation for breach of appellee's monopoly no matter upon how many bases that monopoly rests, Reo Motor Car Co. v. Gear Grinding Machine Co., 42 F. (2d) 965 (C. C. A. 6); Firestone Tire & Rubber Co. v. United States Rubber Co., 79 F. (2d) 948 (C. C. A. 6), we find it unnecessary to pass upon their validity or the question of their infringement.

Decree affirmed as to claims 13 and 20 of patent No. 1,536,044, and claims 5 and 7 of patent No. 1,636,721. The bill is dismissed as to all other claims,

without prejudice."

The appellant, which had the burden, failed to obtain any affirmative action on its attack on the part of the decree holding the method claims valid. As to the issues which were considered, the court affirmed. Appellant failed on every point of its appeal.

In City of Aurora v. West, 7 Wall. 82, this Court held that an inconclusive action by an Appellate Court did not deprive the trial court's adjudication of its effect as an estoppel. This Court said, 19 L. Ed., p. 46:

"Undoubtedly, the view of the pleader was to set up an estoppel against the matters pleaded by the plaintiffs in their first, second, fifth, sixth and eighth replications, and to claim the benefit of the rule that an estoppel against an estoppel opens up the whole matter and set its at large; but the insuperable difficulty in the way of the attempt to apply that rule, even supposing that the former judgments are pleaded as technical estoppels, is, that the matters pleaded in the rejoinder do not amount to an estoppel, as they merely show that the judgment for the plaintiff, as recovered in that case in the court of original jurisdiction, was reversed in the appellate tribunal, and that the cause was remanded to the subordinate court for further proceedings. Second trials often result in the same way as the first, and certainly the reversal of the judgment, under the circumstances shown in the allegations of the rejoinder, is not conclusive evidence that the plaintiffs may not ultimately recover. Unless a final judgment or decree is rendered in a suit, the proceedings in the same are never regarded as a bar to a subsequent action. Consequently, where the action was discontinued, or the plaintiff became nonsuit, or where from any other cause, except, perhaps, in the case of a retraxit, no judgment or decree was rendered in the case, the proceedings are not conclusive. Wood v. Jackson, 8 Wend., 9; Reed v. Locks & Canals, 8 How., 274; Regina v. St. Anne, 9 Q. B., 884; Greely v. Smith, 1 W. & M., 181; Knox v. Waldoborough, 5 Me., 185; Hull v. Blake, 13 Mass., 155; Sweigart v. Berk, 8 S. & R., 305; Bridge v. Sumner, 1 Pick., 371; 2 Taylor, Ev., sec. 1528; Harvey v. Richards, 2 Gall., 231; Ridgley v. Spencer, 2 Binn., 70."

The decision relied upon by the defendant in its rejoinder being inconclusive, the plaintiffs' replication setting up a final judgment in its favor was good and the special pleas were barred. The same result follows from a consideration of this Court's decision in *Durant v. Essex*, 7 Wall. 107, 19 L. Ed. 154. In that case a dismissal in an earlier suit was appealed to this Court and affirmed by a divided court. The Bill of Complaint in the cited case proceeded on the theory that the decree by a divided court in the previous case was not valid and that the plaintiff was not concluded. In overruling this contention and holding that the judgment of dismissal in the previous case was a bar this Court said, 19 L. Ed. 156:

"It has long been the doctrine in this country and in England, where courts consist of several members, that no affirmative action can be had in a cause where the judges are equally divided in opinion as to the judgment to be rendered or order to be made. If affirmative action is necessary for the further progress of the cause, the division operates as a stay of proceedings. If the affirmative action sought is to set aside or modify an existing judgment or order, the division operates as a denial of the application, and the judgment, or order, stands in full force, to be carried into effect by the ordinary means."

and page 157:

"In cases of appeal or writ of error in this court, the appellant or plaintiff in error is always the moving party. It is affirmative action which he asks. The question presented is, shall the judgment, or decree, be reversed? If the judges are divided, the reversal cannot be had, for no order can be made. The judgment of the court below, therefore, stands in full force. It is, indeed, the settled practice in such case to enter a judgment of affirmance; but this is only the most convenient mode of expressing the fact that the cause is finally disposed of in conformity with the action of the court below, and that that court can proceed to enforce its judgment. The legal effect would be the same if the appeal, or writ of error, were dismissed.

The Antelope, 10 Wheat., 66, and Etting v. Bk. of the U. S., 11 Wheat., 59, are cases where the decisions of the court below, or some part of them, were affirmed upon a division of the judges, and a term seldom passes in which there are not several cases disposed of in this way. In Brown v. Aspden, 14 How., 28, Chief Justice Taney observed that there was no difference between a decree in chancery and a judgment at law as to its affirmance on a division of the court. 'In both cases,' he said, 'the motion is to reverse, and if that fails, the judgment, or decree, necessarily stands.'"

The reasoning upon which that decision depends is conclusive of this case. The Reeke-Nash Company sought affirmative action from the Sixth Circuit Court of Appeals to reverse the final decree of April 30, 1934 adjudging the method claims valid. The appellant failed to obtain such affirmative action and thus failed to make good its appeal or to establish error in the decree below.

As the Court said in *Durant v. Essex*, it is the substance and not the form of the order which controls. The appellant in the *Reeke-Nash* case failed to obtain the affirmative action which it sought, reversing the decree below. The language used by the Court in stating that it declined to pass upon the issue cannot control.

The relation of the parties is illustrated by another consideration. A party cannot appeal from or complain of a decree in his favor. Thus petitioner could not appeal from the decree of the District Court of April 30, 1934 which decided in petitioner's favor every issue in the case. No more could petitioner seek a review of the Court of Appeals decision (88 Fed. (2d) 876) since the court while affirming on only part of the claims specifically held that it was granting petitioner all of the relief sought. The burden clearly was on the defendant in that case to ask the Court of Appeals by petition for rehearing to consider and decide on its objections to the portion of the decree holding the method claims and claim 22 valid if defendant still believed that its attack on the decree was correct. The failure of the Court of Appeals to rule on the validity of

these claims could also have been corrected by petition to this Court if the defendant had considered its attack on the validity of these claims sound.

The defendant in the former case, the Reeke-Nash Company, did in fact file a petition for rehearing but did not again urge upon the court its attack upon the portion of the decree holding the method claims and claim 22 valid or ask for a decision on these claims. The Reeke-Nash Company also petitioned this Court for certiorari from that decision (302 U. S. 691, No. 56, Oct. Term, 1937) but in its petition did not repeat its attack upon these claims and did not complain of the failure of the Court of Appeals to reverse this portion of the decree below.

The Sixth Circuit Court of Appeals, in recognizing the estoppel as to part of the claims and ignoring it as to others, has gone beyond the pleadings, which raise only the question of privity.

In the Bill of Complaint in this case it was pleaded that the suit of petitioner against The Reeke-Nash Company had been defended by the National Automobile Chamber of Commerce (R. Vol. I, pages 10 and 11) and that respondent was a privy of The Reeke-Nash Company and was estopped to re-litigate any of the questions decided by said final decree of April 30, 1934 (R. Vol. I, p. 14). In its answer defendant denied that it was in privity with The Reeke-Nash Motors Company but did not otherwise specifically deny the elements or scope of the estoppel (R. Vol. I, pages 32 to 34). Respondent admitted that the decree of April 30, 1934 is final, and that it holds valid all the claims here involved (R. Vol. I, p. 7, Par. 15, p. 32, Par. 15). This admission has never been amended or withdrawn.

Petitioner's Supplemental Bill of Complaint specifically pleaded that the decision of the Court of Appeals affirmed the decree of April 30, 1934 (R. Vol. I, p. 38, Par. 4). Respondent admitted Paragraph 4, pleading the af-

firmance of the final decree of April 30, 1934 (R. Vol. I, p. 42).

At a separate trial on the issue of res judicata the District Court found that the Reeke-Nash case had been defended by the National Automobile Chamber of Commerce of which respondent was a member, for the benefit of respondent and the other members and concluded from the facts found that respondent, Chrysler Corporation, is, and was throughout the pendency of the Reeke-Nash case, in privity with the defendant there, Reeke-Nash Motors Company (R. Vol. I, pages 128 to 133). The Sixth Circuit Court of Appeals did not disturb the District Court's findings that respondent is in privity with The Reeke-Nash Motors Company.

In the Reeke-Nash case the special master found that the suit was being defended by the National Automobile Chamber of Commerce for the benefit of the members, including respondent here (II R. N. 1128, Appendix, p. 28), and that the various members of the National Automobile Chamber of Commerce are privies to defendant, the Reeke-Nash Company (II R. N. 1129, Appendix p. 29). The Sixth Circuit Court of Appeals did not disturb these findings. Thus the tribunals below are uniform in finding the facts establishing privity and in concluding that respondent is in privity with the Reeke-Nash Company and is, therefore, bound by the decree in that case.

POINT G.

Aside from the question of res judicata, the ruling of the Sixth Circuit Court of Appeals that claims 4, 5, 8, 9, 10 and 22 of patent No. 1,536,044 are invalid is in conflict with the decisions of all other tribunals who have ruled upon these claims.

These claims in the form in which they appear in the patent were substituted by amendment of the application for the original claims. The claims were written in their present form in accordance with the suggestion of the Patent Office "to better accord with the Official view" (IV R. N. p. 2063).

After patent No. 1,536,044 in suit had issued the Patent Office declared an interference between this patent and another application. Method claim 4 in suit was count 4 of that interference (IV R. N. pp. 2083-2084). The Patent Office provides only for interferences on common patentable subject matter claimed by a plurality of inventors. (Ewing v. Fowler Car Co., 244 U. S. 1, 7.)

Thus the method claims in suit were cast in their present form at the suggestion of the Patent Office Examiners. After the issuance of the patent an interference was declared on one of the method claims in suit, requiring a further determination by the Patent Office that that claim is patentable and is not invalid on its face.

The Special Master in Swan v. Reeke-Nash, who watched the tests demonstrating the action of the mixture in the manifolds, held that the method claims in suit constitute patentable subject matter, independent of the apparatus, based upon the employment of the natural forces and held all of the claims valid against all of the defenses urged here (II R. N. pp. 1130-1133, 1146-1148; Appendix, pp. 30-33, 46-48). This finding against a privy of respondent here was never reversed, although attacked in the Court of Appeals. The District Court in the instant case did not find any of the claims in suit invalid. Numerous licensees recognized the validity of the patent by taking licenses and paying royalties thereon. The General Motors Corporation retained its license under the patent in suit throughout the life of the patent while contesting at great expense its obligation to pay royalties, although it could at any time have cancelled the license on thirty days notice and contested the validity of the patent if it had chosen to do so (42 Fed. (2d) 454).

POINT H.

The accepted interpretation of this Court's decisions on method or process claims is stated as follows in *Walker on Patents*, Deller's Edition, Vol. I, pp. 39 to 41:

"The generic definition of a process is an operation performed by rule to produce a result. Processes may be classified in the following classifications: (1) operations which consist partly or wholly in the employment of heat, light, electricity, magnetism, chemical action. pneumatics, hydraulics, or some other force producing physical change; (2) operations which consist entirely of mechanical transactions, and which are only the peculiar functions of the respective machines which are constructed to perform them; (3) operations which consist entirely of mechanical transactions, but which may be performed by hand or by any of several different mechanisms or machines. It is settled that all processes which belong to class (1) are subjects of patents. (Cochrane v. Deener, 94 U. S. 780, 24 L. Ed. 139 (1877); * * * Eames v. Andrews, 122 U. S. 40, 30 L. Ed. 1064 (1887); Fermentation Co. v. Maus, 122 U. S. 413, 427, 30 L. Ed. 1193 (1887); * * * and that all processes which belong to class (2) are unpatentable in the United States * * * (citing authorities). It was formerly debatable whether processes which belong to class (3) are subjects of patents or not, but the question has finally been definitely settled in the affirma-(Kahn v. Starrells, 135 Fed. 532, C. C. A. 3 (1905); General Subconstruction Co. v. Netcher, 174 Fed. 236, C. C. A. 7 (1909); Expanded Metal Co. v. Bradford, 214 U. S. 366, 53 L. Ed. 1034 (1909).)"

In other words, under the accepted interpretation the issue as to whether or not a process may be carried out in apparatus other than that disclosed in the patent does not arise in connection with processes involving the employment of electrical or chemical action, pneumatics, hydraulics or similar natural forces, but only in connection with those processes which consist entirely of mechanical transactions.

The method claims in suit include the steps of moving the mixture in a straight line to a zone from which it is distributed to the engine cylinders, directing the movement by forces (the gas pressure resulting from the suction strokes of the cylinders and the inertia acquired by the liquid particles in their movement in a straight line) which tend to distribute the mixture uniformly in all directions from the zone, and further directing the movement by forces (the gas pressure and inertia forces) moving it from the zone successively in different directions transverse to the initial movement. Claims 5, 8 and 10 include the additional step of subjecting the mixture to forces (the gas pressure and inertia forces) at changes in direction which act to prevent impairment of the character of the mixture.

In Cochrane v. Deener, 94 U. S. 780, this Court said, pp. 785-786:

"His improvement, therefore, does not consist in using drafts and currents of air, but in the process as a whole, comprising the application of the blast, and the carrying off of the fine impurities, whereby the middlings are purified preparatory to regrinding after being separated from the other parts."

and pp. 787 and 788:

"That a process may be patentable, irrespective of the particular form of the instrumentalities used, cannot be disputed. * * * A process is a mode of treatment of certain materials to produce a given result. It is an act, or a series of acts, performed upon the subject-matter to be transformed and reduced to a different state or thing."

In Eames v. Andrews, 122 U. S. 40, the process held valid was making a well by driving a tube into the ground, permitting a new action of the forces of gravity and atmospheric pressure.

In Fermentation Co. v. Maus, 122 U. S. 413, the process was in holding beer under controllable pressure of the carbonic acid gas which it generates throughout the kraeusen stage, instead of only near the end of that stage, as theretofore done. This Court said, page 428:

"This is, as was said in Cochrane v. Deener, 'a mode of treatment of certain materials to produce a given result,' and 'an act, or a series of acts, performed upon the subject matter to be transformed and reduced to a different state or thing,' and 'requires that certain things should be done with certain substances, and in a certain order,' It is, therefore, a process or art. The apparatus for carrying out the process is of secondary consequence, and may itself be old, separately considered, without invalidating the patent, if the process be new and produces a new result."

POINT I.

In holding the method claims 4, 5, 8, 9, and 10 invalid as being indefinite the Sixth Circuit Court of Appeals has erroneously extended this Court's decision in *General Electric v. Wabash*, 304 U. S. 364. In that case this Court was dealing with a claim to a product, a lamp filament. The problem was to make a filament which would neither slip nor sag. The claim in substance was for a filament having grains of such size and shape that they do not slip or sag. The invention there was in doing something to the grains so that they would avoid the evils of the prior art, but all that the claim recites is that the product does not have those evils.

A method claim must necessarily be intangible, for the method or art consists of acts or the doing of certain things. This field of invention is wholly distinct from products, such as considered by the court in the cited case, in which the invention must necessarily be in the tangible features of the contour of the grains. As this Court said, p. 373:

"It may be doubted whether one who discovers or invents a product he knows to be new will ever find it impossible to describe some aspect of its novelty."

The forces which act in the Swan method are the forces of gas pressure resulting from the suction of the engine and the inertia of the liquid particles. These forces are disclosed in the specification. Swan did not invent them, and to require them to be detailed in the claims is in conflict with Cochrane v. Deener, 94 U. S. 780, where the claim said "applying air currents" and did not give their source; and with Eames v. Andrews, 122 U. S. 40, where the claim did not mention the forces of gravity and atmospheric pressure.

The invention is in the acts which are performed by means of the forces. No complaint is made as to the definiteness of the acts which constitute the method of the invention.

The court below also held that the claims are faulty because they do not describe how the forces operate. To impose such a requirement on a claim would in many instances such as the present one make it impossible to claim a valuable invention. As stated by the Master in Swan v. Reeke-Nash, II R. N., page 1141, Appendix page 41:

"The operation of the forces as pictured by defendant's tests was unknown to plaintiff's expert,"

Even today no two experts can agree in describing how the forces operate. The requirement which the decision of the court below would impose upon the patentee is in direct conflict with the rule established in numerous decisions by this Court that an inventor need not describe, or even know, the scientific explanation of the operation of his invention. In *Eames v. Andrews*, 122 U. S. 40, 55, 56:

"It is to be observed that the scientific theory and principle, the application of which is supposed to constitute the invention of Colonel Green, are not set forth either in the original or reissued patents. This feature was commented upon by Mr. Justice Blatchford in Andrews v. Cross, 19 Blatchford, 294, 305, as follows: 'It may be that the inventor did not know what the scientific principle was, or that, knowing it, he omitted, from accident or design, to set it forth. That does not vitiate the patent. He sets forth the process or mode of operation which ends in the result, and the means for working out the process or mode of operation. The principle referred to is only the why That is not required to be set and the wherefore. forth. * * * An inventor may be ignorant of the scientific principle, or he may think he knows it and yet be uncertain, or he may be confident as to what it is, and others may think differently. All this is immaterial, if by the specification the thing to be done is so set forth that it can be reproduced."

The rule is summarized by the Supreme Court in *Diamond Rubber v. Consolidated Tire*, 220 U. S. 428 (1911) which involved rubber tires, where Mr. Justice McKenna says, at pp. 435-436:

"And how can it take from his merit that he may not know all of the forces which he has brought into operation? It is certainly not necessary that he understand or be able to state the scientific principles underlying his invention, and it is immaterial whether he can stand a successful examination as to the speculative ideas involved. (Citing the Driven Well case, supra, Cleveland Foundry Co. v. Detroit Vapor Stove Co., supra, and others.) He must, indeed, make such disclosure and description of his invention that it may be put into practice."

POINT J.

The Sixth Circuit Court of Appeals ruled as follows on claim 22, R. Vol. V, p. 1858:

"Claim 22 of patent 1,536,044, relates to the part of the roof of the header which is opposite the riser and requires it to be 'symmetrically formed and situated with reference to the outlets to uniformly influence entering mixture and cause the same to distribute in uniform character in the successive directions determined by the outlets and induction cycles of the engine.'

* * * * * *

The claim describes the added element in terms of function and result, and hence is invalid."

In Gilchrist Co. v. Kar-Lac Co., 29 Fed. (2d) 153, the Seventh Circuit Court of Appeals held, page 154:

"Invalidity is urged here on the further ground that the Gilchrist patent is an attempt to monopolize an abstraction. This contention must fail. All of the claims are in terms of structure, and the patent embraces only the device by which the new result is made possible, and lays no claim to the result or function of the combination. That some of the elements of the combination are claimed in terms of 'means' defined in terms of function is not objectionable in combination claims. Continental Paper Bag Co. v. Eastern Paper Bag Co., 210 U. S. 405, 422, 28 S. Ct. 748, 52 L. Ed. 1122."

In Research v. Chase, 88 Fed. (2d) 353, the Seventh Circuit Court of Appeals said, page 354:

"So it is insisted that the language of the claim, 'so arranged that when the blade is in contact with the metal of the can, the first forward movement of the traction wheel will cause the blade to puncture the can, and as the movement continues the blade will shear the metal of the can,' does not comply with the

[†] The omitted sentence attributing certain statements to petitioner's expert is erroneous, but immaterial to the functional claim question. Respondent asserted to the Court of Appeals that petitioner's expert had stated there was no substantial difference between the wall opposite the riser in Swan and in the prior art. This statement was incorrect. The comparison was between the accused manifold and the Reeke-Nash manifolds adjudicated to infringe the patent in suit and the testimony is that they are the same (R., Vol. I, pages 348 to 349).

statute and constitutes a claim functional in character without specific teaching as to the solution of the problem. However, we observe that in his description and specifications, Chase made full disclosure of every step taken by him. *** So, it seems to us, upon reading the claims and description, any person skilled in the art to which they appertain, could make, combine and use the same, as contemplated by law. The language used by this court in Gilchrist Co. v. Kar-Lac Co., 29 F. (2d) 153, 154, is in point."

The same rule was followed by the Seventh Circuit Court of Appeals in *Apex v. Maytag*, 122 Fed. (2d) 182, 186 (Cert. denied 314 U. S. 687).

In Buono v. Yankee Maid, 77 Fed. (2d) 274, the Second Circuit Court of Appeals held, page 277:

"The only debatable matter is of the language of the claims themselves; it is the old question of how far a claim may safely be cast in terms of function. * * * The other elements of claim 6 except a single one are in mechanical terms referable to the disclosure, and are clearly not functional. The exception is, 'operating means connected to said eccentric device and turning said pivoted device at predetermined intervals.' This too is readily enough identified by the disclosure, and though it does speak in terms of function that is inevitable to some degree, if the claim is to have any generality whatever. The very test of equivalency is in terms of function, 'the same result by the same means'; and it is only by recourse to that standard that a patentee can pass beyond the very details of his disclosure. * * * In the case at bar the phrase was justified because the invention did not reside in the mechanical train connecting the eccentric with the table, but in a train which should tilt it at intervals longer than the oscillations of the rib. The details not being important, the general notion so embodied the inventors might protect."

In the instant case the ruling of the Sixth Circuit Court of Appeals is that the claim is invalid because one of the elements of the combination is defined in functional terms. This is directly contrary to the rule followed by the Seventh Circuit in the above cited cases to the effect that defining an element of a combination in functional terms does not invalidate the claim. This rule as stated by the Seventh Circuit Court of Appeals is based on this Court's decision in *Continental Paper Bag Co. v. Eastern*, 210 U. S. 405. In that case this Court held valid claim 2 of the patent (210 U. S. 417) which is for a combination of eight elements, all but one of which are defined in functional terms.

POINT K.

In Swan v. General Motors, 42 Fed. (2) 452, Judge Westenhaver said, p. 455:

"Swan sought to solve the problems so stated and discussed. He did so, in my opinion, by introducing a new and original principle of operation."

In Swan v. Reeke-Nash the Special Master found (II R. N., page 1117, Appendix, p. 17):

"Swan is a pioneer in the patented method for distributing wet fuel mixtures as distinguished from dry mixtures and nowhere does the prior art show any recognition or realization of the solution of this problem which Swan solved by his patented method."

The Special Master concluded (II R. N., page 1127, Appendix, p. 27):

"That the patent in suit No. 1,536,044, is a basic patent and defines and covers a pioneer invention or inventions, and is entitled to a liberal interpretation and a broad range of equivalents."

In affirming, the Court of Appeals for the Sixth Circuit held, 88 Fed. (2d) 887:

"Whether or not patent No. 1,536,044 described a pioneer invention, as in effect held in the General Motors Case (42 F. (2d) 452), under the specifications, which are to be read with the claims, though they may not expand or limit them, Swan is entitled to a range of equivalents broad enough to cover appellant's manifolds. Cf. Bishop & Babcock Mfg. Co. v. Fulton Co., 37 F. (2d) 293 (C. C. A. 6). This is true even as to claims 11, 12 and 13, in which, as in the other claims, the gist of the inventive concept was the creation of the maximum turbulence as above described, not restricted to any particular form. Cf. United Shoe Machinery Corp v. O'Donnell Rubber Products Co., 84 F. (2d) 383 (C. C. A. 6)."

The District Court in the Fourth Circuit case quoted and followed the above statement of the Sixth Circuit Court of Appeals, 25 Fed. Supp. 29.

In the final suit against General Motors Corporation a Special Master (Mr. Friebolin) concluded that Swan was not a pioneer. Judge Nevin reversing this ruling said (43 Fed. Supp. 499, 503):

"In his report (p. 13) the Special Master says: 'I conclude however that the evidence does not show that the advance made by Swan entitles this patent to be considered as a pioneer patent.' The court finds itself unable to agree with this conclusion of the Special Judge Westenhaver found that Swan introduced 'a new and original principle of operation.' 42 F. (2d) 455. In the Reeke-Nash case the Special Master (Mr. Woods) held as a conclusion of law: '(3) That the patent in suit, No. 1,536,044, is a basic patent and defines and covers a pioneer invention or inventions, and is entitled to a liberal interpretation and a broad range of equivalents.' His (Special Master Woods') report was confirmed by Judge Hahn of this This Court agrees with this conclusion of Special Master Woods and Judge Hahn."

The District Court in the instant case made no finding or conclusion on this question. The Court of Appeals in the instant case in effect departed from their previous ruling by holding that the prior art may be modified to justify infringement, thus differing from all the previous District Courts who have ruled on this issue, each of which

has held Swan to be a pioneer.

The rule has been established by the decisions of this Court that the first to invent an apparatus or method for performing a particular method is a pioneer. (Morley v. Lancaster, 129 U. S. 263; Hildreth v. Mastoras, 257 U. S. 27.) Under this rule Swan is a pioneer. He was the first to uniformly distribute to the cylinders a wet mixture, which is the fuel automobiles have had to use since about 1911.

POINT L.

The Court of Appeals for the Sixth Circuit, in its opinion in this case, gave no weight to the findings of the Special Master in the *Reeke-Nash* case, adopted by the District Court, in holding claims 4, 5, 8, 9, 10 and 22 invalid and in finding claims 13 and 23 not infringed. The court referred to the *Reeke-Nash* case in a footnote (R. Vol. V, page 1852) as follows:

"In a patent infringement case consolidated therewith [Reeke-Nash Motors Co. v. Swan Carburetor Co., 88 Fed. 2d at 885], claims 13 and 20 of patent 1,636,721 and claims 5 and 7 of patent 1,536,044 were held valid and infringed. The validity of other claims, including that of the method claims of patent 1,536,044, was not passed upon and as to such other claims the bill was dismissed without prejudice."

Rule 52 provides:

"Findings of fact shall not be set aside unless clearly erroneous, and due regard shall be given to the opportunity of the trial court to judge of the credibility of the witnesses. The findings of a master, to the extent that the court adopts them, shall be considered as the findings of the court."

The rule, and the substantial reason of the rule, are not limited to findings of fact made in the particular case considered by the Appellate Court. Normally, it is true, findings of fact in a prior case against the same party or a privy would either have been binding under the doctrine of res judicata or would have been reversed. Here, however, the careful and detailed findings by the Special Master in the Reeke-Nash case (Appendix, p. 12) against a privy of respondent, covering every issue raised in this case, were adopted by the District Court, were not reversed by the Court of Appeals in that case, but were treated neither as res judicata nor as findings under rule 52 by the Court of Appeals in the instant case.

The trial in the *Reeke-Nash* case before the Special Master consumed 40 days. The same Master, Mr. Woods, acted as Commissioner in the second *General Motors* case and heard testimony and watched tests for forty days. The defendant filed eighty-seven exceptions to the report of the Special Master (II R. N., pages 1163 to 1206, inclusive). These exceptions were briefed and argued at length and in full detail before Judge Hahn, who adopted the Master's report in its entirety (R. Vol. I, page 19).

The Master's findings under the plain terms of Rule 52 should "not be set aside unless clearly erroneous." While the courts in the different circuits differ to some extent as to the weight to be given to the trial court's findings of facts there is no dispute that they are at least entitled to substantial weight.

Even before the adoption of the new rules of civil procedure the rule in this Court has uniformly been to accept the findings as mandatory in the absence of a clear showing of error or mistake. In *Tilghman v. Proctor*, 125 U. S. 136, pages 149 to 150:

"In dealing with these exceptions, the conclusions of the master, depending upon the weighing of conflicting testimony, have every reasonable presumption in their favor, and are not to be set aside or modified unless there clearly appears to have been error or mistake on his part. Medsker v. Bonebrake, 108 U. S. 66; Donnell v. Columbian Ins. Co., 2 Summer 366, 371; Mason v. Crosby, 3 Woodb. & Min. 258, 269; Paddock v. Commercial Ins. Co., 104 Mass. 521, 531; Richards v. Todd, 127 Mass. 167, 172."

In Warren v. Keep, 155 U.S. 265, this Court said, page 267:

"The master acted in view of this evidence, and the court below concurred in his finding, except in some unimportant particulars. As no obvious error or mistake has been pointed out to us, their conclusions must be permitted to stand. Tilghman v. Proctor, 125 U. S. 136; Crawford v. Neal, 144 U. S. 585; Furrer v. Ferris, 145 U. S. 132."

Those who promulgated and approved Rule 52 stated that it was the purpose of this rule to merge the former law and equity practice into the equity practice of Tilghman v. Proctor, supra, and Warren v. Keep, supra. We think this is clear from the "shall not" proviso of the rule and from the references to these decisions in the official notes to the Federal Rules of Civil Procedure, in connection with Rule 52 (pages 46 and 47).

Respectfully submitted,

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B. D. WATTS,
H. F. McNenny,

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RICHEY & WATTS,

1150 Union Commerce Bldg.,
Cleveland, Ohio,
Of Counsel.

IN ALL THESE MANIFOLANIFOLDS THE HEATING UNITS ARE IDENTICAL, EMPLOY THE SO-CALLED "HOT SPOT"

CHRYSLER CORPORATION MANIFOLDS

Exhibit 201

IN ISSUE

(Other Forms, R. Vol. IV, pp. 1541 to 1565, incl.)

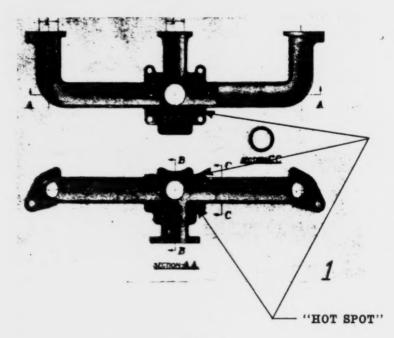


FIG. I

SECOND GROUP OF GENERAL MOTORS MANIFOLDS

Exhibit P

ADJUDICATED TO INFRINGE

G. M. v. Swan, 88 F. (2d) 876 (C. C. A. 6)

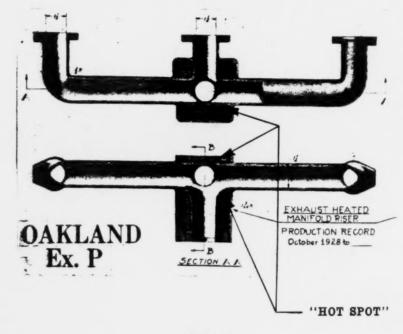


FIG. II

Mr. Woods and Jury (Judge Hahn)

ICAL, THE FUEL USED WAS IDENTICAL, AS WAS S THE HEAT, ITS APPLICATION, AND THE MANN 'OT" IN THE SAME WAY; ALL WERE USED ON THE SAME KIND AND TYPE OF ENGINE.

DS

SECOND GROUP OF GENERAL MOTORS MANIFOLDS

Exhibit R

ADJUDICATED TO INFRINGE

G. M. v. Swan, 88 F. (2d) 876 (C. C. A. 6)

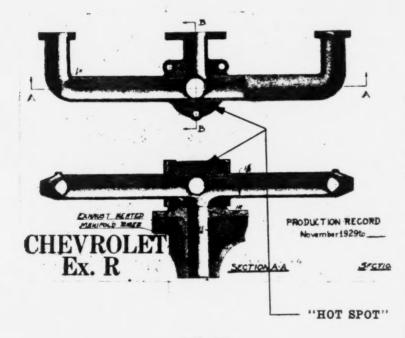


FIG. III

Mr. Woods and Jury (Judge Hahn)

THIRD AND FOURTH GROUPS OF GENERAL MOTORS MANIFOLDS

Exhibit No. 40-A

ADJUDICATED TO INFRINGE

Swan v. General Motors, 43 F. S. 499

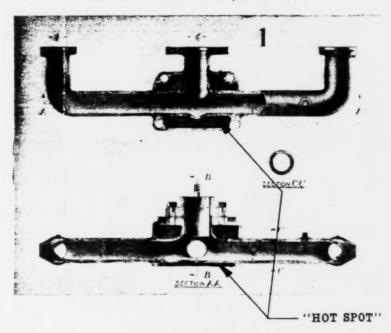


FIG. IV

Mr. Friebolin and Judge Nevin

MANNER OF ITS USE; ALL

S

REEKE-NASH MANIFOLD (AJAX)

Ajax Exhibit 40

ADJUDICATED TO INFRINGE

Reeke-Nash v. Swan, 88 F. (2d) 876 (C. C. A. 6)

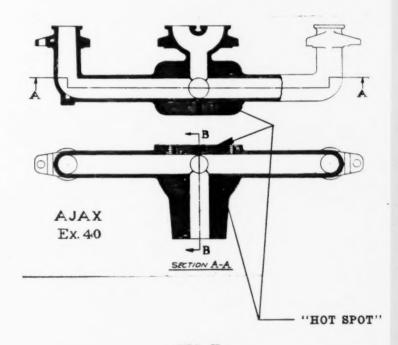


FIG. V

Mr. Woods, Judge Hahn and C. C. A. 6 (88 F. (2d) 885)





In the Supreme Court of the United States OCTOBER TERM, 1942.

No.

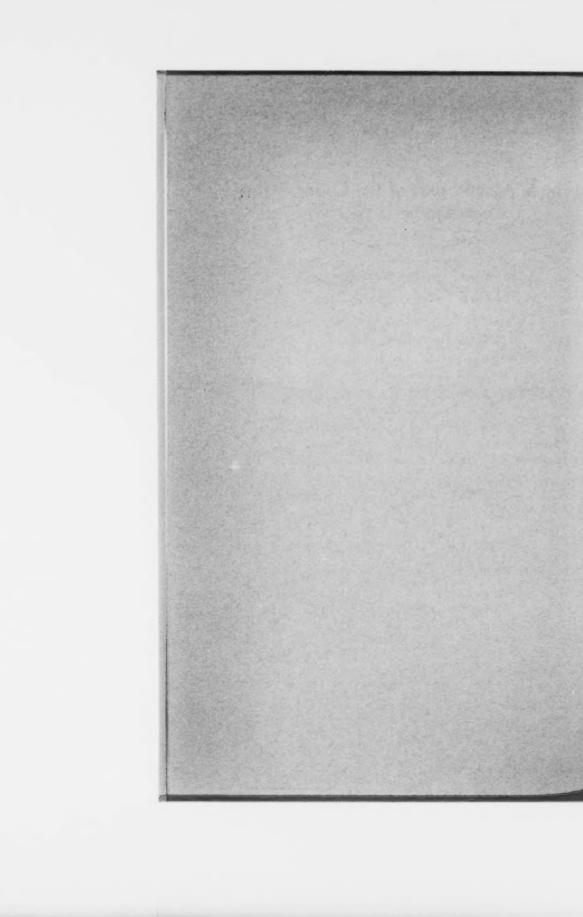
THE SWAN CARBURETOR COMPANY,
Petitioner and Appellant Below,

VB.

CHRYSLER CORPORATION,
Respondent and Appellee Below.

APPENDIX TO BRIEF OF PETITIONER.

Report of Special Master in Swan v. Reeke-Nash, Plaintiff's Exhibit 30; Found at II R. N. 1101 (Plaintiff's Physical Exhibit 27B) Tice Article, "Motor," April, 1911, Plaintiff's Exhibit 37A; Found at III R. N. 1321 (Plaintiff's Physical Exhibit 27C)	1
	63
Tice Article, "Motor," May, 1911, Plaintiff's Exhibit 37B; Found at III R. N. 1325 (Plaintiff's Physical Exhibit 27C)	71



APPENDIX.

Report of the Special Master In the Case of Swan v. Reeke-Nash, Northern District of Ohio, Eastern Division, Equity No. 2047.

REPORT OF WM. B. WOODS, SPECIAL MASTER.

(Filed August 21, 1933.)

To the Honorable Paul Jones, S. H. West and Geo. P. Hahn, Judges of the District Court of the United States, For the Northern District of Ohio, Eastern Division:

Pursuant to an order made and entered in this cause on May 26, 1932, at a term of this Court held in the City of Cleveland, in said District, the undersigned, Wm. B. Woods, Special Master in Chancery, has proceeded to take and hear the evidence offered by the respective parties and to report his findings and conclusions along with his recommendations concerning the relief demanded, to this Court; and further,

Pursuant to said order there is stipulated into this cause by agreement of counsel, the pleadings, evidence, proofs and exhibits, including the affidavits, testimony, exhibits, and substantially all other matters heretofore

^{*}The boldface page headings and folios in this Report of the Special Master refer to the pagination of the Record in the case of Swan v. Reeke-Nash.

filed, taken, submitted, offered or adduced in the case of *The Swan Carburetor Company v. General Motors Corporation*, at Law No. 14,169 in this Court, and there is included herein such parts of said record as the parties hereto have offered for the record in this case; therefore,

I, Wm. B. Woods, as Special Master in said cause. do respectfully report that I have proceeded to investigate the matters so referred to me, that I have been attended by the parties and their respective counsel at my office at 1214 Terminal Tower Building, Cleveland, Ohio: that pursuant to said order I proceeded to hear witnesses and counsel to receive and consider testimony, affidavits. exhibits and other proof, including that heretofore filed. submitted, taken, adduced and stipulated into this case as aforesaid or otherwise, to examine and consider pleadings, proof, briefs, arguments, and any and all other papers or matters relating to the questions involved and the issues raised herein, to rule on the admissibility of evidence, but have preserved such evidence as counsel has demanded, which the Master deemed inadmissible, together with his ruling thereon for the ultimate and final ruling by the Court, to observe such tests and experiments as the parties performed or caused to be performed, and to hold the sessions within the District and Division of this Court, at such time as directed, and thus to hear and consider all the proof and argument pertinent to the issues of law and fact arising in the cause. Such hearings have been had; arguments of counsel have been had, briefs of counsel have been filed, together with suggested findings of fact and conclusions of law, and upon consideration of the same, I find and report as follows:

PLEADINGS.

This is a suit for infringement filed November 3, 1926, on Swan Patent No. 1,536,044, for "method and means to facilitate distribution of fuel in internal combustion engines." A supplemental bill of complaint was filed September 23, 1927, alleging infringement of the Swan Patent No. 1,636,721, for a "manifold."

Although this was the second patent to issue, it was issued on an application filed September 17, 1921, Serial No. 501,314, of which the application Serial No. 747,991 filed November 5, 1924, for the first Swan Patent, was a continuation in part. The pleadings also include answers, amendment to answers, motions and stipulations.

The alleged infringements are the manifolds made by The Nash Motors Company and sold by the defendants in the year 1926, and were used in Nash automobiles known as Special Six, Advance Six and the Ajax.

MANIFOLDS, SUBJECT MATTER OF THE SUIT.

The subject of the invention involved in this suit is an intake manifold for use in an automobile. The intake manifold is a pipe connecting the carburetor with the cylinders of a motor. The function of the carburetor is to mix the liquid fuel with air by means of its mechanism, which mixture must be conveyed to the cylinders of the engine wherein the mixture is to be exploded. This manifold pipe is connected at one end to the outlet from the carburetor as a single pipe, which part of the manifold is called a "riser," and this "riser" enters a transverse pipe called a "header," and this "header" divides into the number of pipes sufficient to connect with all the ports of the cylinders. These pipes from the "header" to the cylinders are called "branches." Sometimes one "branch" feeds one cylinder with fuel, sometimes two cylinders, and when a single branch feeds two cylinder ports they are said to be "siamesed." In some manifolds there are branches siamesed and another branch or branches for a single cylinder.

The fuel mixed with air is drawn by the suction of the cylinders out of the carburetor through the riser, the header and the branches into the cylinders. The products of combustion caused by explosions in the cylinders pass into an "outlet or exhaust manifold" and are usually conveyed in a hot condition around or adjacent to the "riser" of the inlet manifold so as to heat it or to form

a "hot spot."

The Swan Patents describe the form of intake manifold which is sometimes known as a "T" manifold of rectangular or square cross-section. As used herein, a "T" manifold is one in which there is a vertical riser leading from the carburetor to the longitudinal header of the manifold. In this riser there is the usual butterfly throttle valve. At the juncture of the riser and the header the forward and rear branches of the header and riser form the letter T. That portion of the manifold which is at the top of the riser and from which there are three passages, is referred to as the "T," and in the Swan Patents this is referred to as the "distributing zone."

ISSUES.

The two General Motors cases heretofore tried concerned liability on a royalty contract for the use of the Swan patents. The entire record in case No. 14,169 is stipulated into the record in this case and certain portions of the record in the second case, No. 16,366, are also stipulated into this record. The license there involved was taken by the General Motors Corporation, which included the Buick Motor Company in June, 1923, when application for the second Swan patent was the only one then pending in the Patent Office.

In the General Motors cases, after the Buick Company notified plaintiff in the Spring of 1924 that it intended to give up the square section manifold and use a round section manifold, the application for the first Swan patent was filed on November 5, 1924, as a "partial continuation" of the application for the second patent.

The second Swan patent, No. 1,636,721, issued on the earlier application, and its claims 5, 7 and 8 in issue being limited to manifolds with straight ducts which change direction at right angles to each other and "devoid of curves * * in the direction of the flow of the fuel mixture." The defendant here asserts there is no infringement of the manifolds in issue which are circular in cross-section and which it asserts are replete with curves. Defendant further asserts that if the claims are construed to cover defendant's manifolds they are met by the prior art.

Defendant further asserts that until the application for the second patent, on November 5, 1924, there had been no claim that a round section manifold was within the scope of the Swan's invention.

In the second Swan application claims are made which are asserted to be broad enough to cover a round

section manifold.

In this situation the defendant asserts that the socalled "Swan method" claimed in the first Swan Patent which issued on the second Swan application, is a false and mythical mode of operation. Defendant asserts that this "method" is non-existent and that the claims thereto in the first Swan Patent are invalid.

The issues are thus resolved to this, plaintiff asserts (1) that the Swan manifold operates like and employs the method described in the Swan Patents, and (2) that the Swan manifold realizes equal distribution. Both asser-

tions are denied by defendant and other items in dispute between the parties are collateral to these main questions in issue.

FACTS ADMITTED OR AGREED TO BY BOTH PARTIES.

(1) The plaintiff, The Swan Carburetor Company, is and was a corporation of the State of Ohio having its principal place of business at Cleveland, Ohio, as alleged in the bill of complaint and the supplemental bill of complaint, and is the sole owner of the entire right, title and interest in and to the inventions and patents in suit along with the whole right to recover for all the infringement therein complained of and to be awarded the relief prayed for in the bill of complaint and supplemental bill of complaint. The Swan Carburetor Company is properly the sole plaintiff here having all the right, title and interest of every nature whatsoever which formerly rested in the joint plaintiffs named in the bill of complaint and supplemental bill of complaint, as appearing in the stipulation and order, plaintiff's Ex. 3, made by reference a part hereof.

(2) The defendant, The Reeke-Nash Motors Company, is and was an Ohio corporation, and has and had a regular and established place of business at Cleveland, Ohio, as alleged in the bill of complaint and supplemental

bill of complaint.

(3) Both The Reeke-Nash Motors Company and The Nash Motors Company were named as defendants in the original and supplemental bills of complaint, the defendant, The Reeke-Nash Motors Company, alone filed its answers to the bill of complaint and the supplemental bill of complaint. The defendant, The Nash Motor Company, was not served and made no answer to either the original bill of complaint or the supplemental bill of com-

plaint.

(4) The manifolds charged by plaintiff to infringe the patents in suit were all made, used and sold in connection with six cylinder engines, and all comprise a riser, header and branches, of which typical risers are shown in plaintiff's Ex. 50, which is by reference made a part hereof, and of which the header and branch portions, with certain integrally formed risers, are shown in plaintiff's documentary exhibits 40 to 46 inclusive, part of which by corresponding numbers are also illustrated in plaintiff's physical exhibits 41A, 42A, 43A, 45A and 46A,

all of which by reference are made a part hereof. The said manifolds and engines were made or caused to be made by The Nash Motors Company, knowing and intending that certain quantities of them were to be used and sold by the defendant, The Reeke-Nash Motors Company. Such manifolds and engines were used and sold by The Reeke-Nash Motors Company in the Northern District of Ohio, Eastern Division, prior to the filing of the original bill of complaint and the supplemental bill of complaint and subsequent to the issuance of the

respective patents in suit.

(5) The defense of this suit is made by the answer and pleadings of the defendant, The Reeke-Nash Motors Company; and in accordance with Article VI of the constitution of the National Automobile Chamber of Commerce, Inc. (plaintiff's Exs. 74 and 144), and at the request of the Nash Motors Company, the said Chamber of Commerce assumed and is carrying on and controlling the defense of this suit, selected counsel therefor, and has assumed the payment of all expenses of said defense; and said Chamber of Commerce has assumed and is carrying on and controlling the defense of the pending suits brought by the plaintiff on the same patents against its members, The Nash Motors Company, the Reo Motor Car Company and the Willys-Overland Company, selected counsel therefor, and has assumed the payment of expenses of such suits.

(6) The patent in suit, No. 1,636,721, was issued July 26, 1927, to John W. Swan on application for Letters Patent in the United States, Serial No. 501,314, filed September 17, 1921, and the patent in suit, No. 1,536,044, issued April 28, 1925, upon an application for Letters Patent in the United States filed by John W. Swan, Serial No. 747,991, November 5, 1924. The later application and earlier patent refer to the earlier application and is a continuation of the earlier application as stated

in said patent.

(7) The patent in suit, No. 1,536,044, along with its complete file wrapper and contents including the application Serial No. 747,991, and the application Serial No. 501,314, along with its complete file wrapper and contents up to and including the amendment of March 3, 1927, were exhibited to the Court for the Northern District of Ohio, Eastern Division, in the case of The Swan Carburetor Company v. General Motors Corpora-

tion, at Law No. 14,169, decided by Judge Westenhaver, 42 Fed. (2) 452, affirmed by the Court of Appeals (C. C. A. 6) 44 Fed. (2) 24. Both of the patents in suit, along with the complete file wrapper and contents of each of them, were exhibited to the Commissioner in the case of The Swan Carburetor Company v. General Motors, at Law No. 16,366. In both of the foregoing cases the invention or inventions and improvements disclosed and claimed in the patents in suit were considered, and discussed by the tribunals which heard and decided the issues therein raised, which appertained to the said invention or improvements and said patents and applications.

- (8) The issues in this case are in many instances the same as the issues in the first General Motors case hereinbefore referred to. The parties are represented by the same counsel, and the major portion of the testimony and exhibits submitted in the first General Motors case would have had to be adduced and submitted again in this case, except for the agreement of counsel to stipulate such testimony and exhibits into this case as if it had been taken here in the first instance.
- (9) The Buick manifolds, plaintiff's Exs. 6 to 11 inclusive, and including the risers and Marvel heaters for which this plaintiff recovered royalties in the action at Law No. 14,169 against General Motors Corporation hereinabove referred to, are substantially identical with defendant's manifolds here charged to infringe, plaintiff's Exs. 40 to 46 inclusive and the physical exhibits hereinabove referred to, and including the risers and Marvel heaters, plaintiff's Ex. 50. The Buick manifolds including the risers were used with six cylinder engines, as were and are all of defendant's manifolds here charged to infringe.

(10) The claims selected to exemplify the invention and as the basis for the charge of infringement of the first Swan Patent No. 1,536,044 are method claims Nos. 4, 5, 8, 9 and 10, as follows:

4. A method of distributing a fuel mixture to an engine which consists in moving the mixture in a straight line to a zone from which it is distributed to a plurality of engine cylinders, directing said movement by forces which tend to distribute the mixture uniformly in all directions in a plane transverse to said movement, and further directing the movement of the mixture by forces tending to move it successively in a plurality of directions transverse to the original direction, to the cylinders.

5. A method of distributing a fuel mixture to an engine which consists in moving the mixture to a zone through which it is distributed to a plurality of engine cylinders, modifying said movement by forces tending to distribute the mixture in uniform character in various directions in a plane transversely of said zone, and further subjecting the movement of the mixture to forces acting to prevent impairment of the character of the mixture due to influences created by any changes of direction beyond the zone.

8. A method of distributing a fuel mixture to an engine which consists in moving the mixture to a zone through which it is distributed to a plurality of engine cylinders, subjecting said movement to forces acting to distribute the mixture in uniform character in three directions in a plane transverse to said movement, and further subjecting the movement of the mixture to forces acting to prevent impairment of the character of the mixture due to influences created by any changes of direction beyond the zone.

9. A method of distributing a fuel mixture to a six-cylinder engine which includes the moving of the mixture to a zone through which it is distributed in three directions in a plane transverse to said movement, and subjecting said movement to forces tending to distribute charges in alternating directions and in uniform character in all of said directions.

10. A method of distributing a fuel mixture to a six-cylinder engine which includes the moving of the mixture to a zone through which it is distributed in three directions in a plane transverse to said movement, subjecting said movement to forces tending to distribute charges in alternating directions and in uniform character in all of said directions, and further subjecting the movement of the mixture towards adjacent pairs of cylinders to forces tending to qualify the charges for said pairs in substantially equal proportions of wet mixture constituents.

Also of the first Swan Patent are included apparatus claims Nos. 11, 12, 13, 20, 22 and 23, as follows:

- 11. An inlet manifold comprising a distributing chamber having a single inlet conduit and a plurality of outlet conduits, said chamber being formed of walls the intersections of which form straight lines.
- 12. In an inlet manifold, a distributing chamber having a single inlet conduit and a plurality of outlet conduits, said chamber being formed of walls the intersections of which form straight lines, the inlet conduit being at right angles with all outlet conduits.
- 13. In an inlet manifold, a distributing chamber having a single inlet conduit and a plurality of outlet conduits, said chamber being formed of walls the intersections of which form straight lines, one of said walls being opposite the inlet duct and symmetrically shaped and situated relative thereto, so that entering mixture may be influenced by said wall uniformly in all directions transversely to the entering stream.
- 20. In an inlet manifold, a distributing chamber having a single inlet conduit and three branch conduits, one of the walls of the chamber being opposite the inlet duct and symmetrically formed and situated with reference to the branch ducts so that entering fluid may be influenced by said wall uniformly in all directions transverse to the entering stream, and the branch conduits being of substantially uniform shape throughout and at any turn thereof presenting similar walls shaped and situated so that passing mixture may be influenced thereby in a manner to distribute equally to cylinders to which said turns may lead.
- 22. In combination with a six cylinder engine, a manifold comprising a distributing chamber having an intake and three outlets each leading to a pair of cylinders, the wall of each leading to a pair of cylinders, the wall of the chamber opposite the intake being symmetrically formed and situated with reference to the outlets to uniformly influence entering mixture and cause the same to distribute in uniform character in the successive directions determined by the outlets and induction cycles of the engine.

23. In combination with a six cylinder engine, a manifold comprising a distributing chamber having an intake and outlet branches, the wall of the chamber opposite the intake being symmetrically formed and situated with reference to the outlets to uniformly influence entering mixture and cause the same to distribute in uniform character in the directions determined by the outlets and induction cycles of the engine, the outlet with the intakes of pairs of cylinders, and the angular formations being shaped and situated so that passing mixture will be influenced thereby in a manner tending to distribute equally to the cylinders of the pair to which the branches respectively relate.

Of the second Swan Patent, No. 1,636,721, there are included apparatus claims Nos. 5, 7 and 8, as follows:

- 5. In a manifold for a six-cylinder internal combustion engine, the combination with a main manifold duct, level throughout its length, a straight or substantially straight riser duct connecting the carburetor with the central part of the main duct and being at right angles, or substantially at right angles thereto, the interior or the connection of the riser to the main duct being at a substantially uniformly sharp angle all around the connection, three secondary ducts each for connecting the main duct to two of the engine cylinders, the middle secondary duct being connected to the main duct at the junction of the riser with the main duct and at right angles, or substantially right angles thereto, a distributing zone with a non-recessed roof being formed at the junction of the main duct, the riser and the middle secondary duct, the two other secondary ducts being connected to the main duct at the ends thereof, all of said secondary ducts being parallel, or substantially parallel to each other and perpendicular or substantially perpendicular to the main duct, on the interior the end secondary ducts making a right angle connection with the main duct at the sides nearest the middle and the middle secondary duct making a sharp connection with the interior of the main duct, and all of said ducts and riser being devoid of curves and recesses in the direction of flow of the fuel mixture.
- 7. In a manifold for a six-cylinder internal combustion engine, the combination with a main

manifold duct, level throughout its length, a straight or substantially straight riser duct connecting the carburetor with the central part of the main duct and being at right angles, or substantially at right angles thereto, the interior of the connection of the riser to the main duct being at a substantially uniformly sharp angle all around the connection, three secondary ducts each for connecting the main duct to two of the engine cylinders, the middle duct with the two middle cylinders and each end duct to the two nearest end cylinders, the middle secondary duct being connected to the main duct at the junction of the riser with the main duct and at right angles, or substantially right angles thereto, a distributing zone with a roof having a curved portion being formed at the junction of the main duct, the riser and the middle secondary duct, the two other secondary ducts being connected to the main duct at the ends thereof, all of said secondary ducts being parallel or substantially parallel to each other and perpendicular or substantially perpendicular to the main duct on the interior, each of the end secondary ducts making a right angle connection with the main duct at the sides nearest the middle duct and the middle secondary duct making a sharp connection with the interior of the main duct, and all of said ducts and riser being devoid of curves and recesses in the direction of flow of the fuel mixture.

8. In a manifold for a six-cylinder internal combustion engine, the combination with a main manifold duct, level throughout its length, a straight or substantially straight riser duct connecting the carburetor with the central part of the main duct and being at right angles, or substantially at right angles thereto, the interior of the connection of the riser to the main duct being at a substantially uniformly sharp angle all around the connection, three secondary ducts, each for connecting the main duct to two of the engine cylinders, the middle duct with the two middle cylinders and each end duct to the two nearest end cylinders, the middle secondary duct being connected to the main duct at the junction of the riser with the main duct, and at right angles, or substantially right angles thereto, a distributing zone with a roof curved on a greater radius than the adjacent secondary duct and formed at the

junction of the main duct, the riser and the middle secondary duct, the two other secondary ducts being connected to the main duct at the ends thereof, all of said secondary ducts being parallel, or substantially parallel to each other and perpendicular or substantially perpendicular to the main duct on the interior, each of the end secondary ducts making a right angle connection with the main duct at the side nearest the middle duct and the middle secondary duct making a sharp connection with the interior of the main duct, and all of said ducts and riser being devoid of curves and recesses in the direction of flow of the fuel mixture.

FINDINGS OF FACT.

- (1) The first Swan patent issued April 28, 1925, and the second, July 25, 1927; the suit on the first patent was begun in November, 1926, and upon the second patent by supplemental bill of complaint filed in September, The infringements alleged herein are for Nash 1927. manifolds made in 1925 and 1926 on Nash cars sold by defendant. In April, 1931, plaintiff brought suit against the Nash Company, and at about the same time the Reo Motor Company was sued for alleged infringements begun in January, 1927, and the Willys-Overland Company for alleged infringements begun in 1925. The Dodge Brothers Company is claimed to have infringed in 1928 but it has not been sued nor has the Chrysler Company, its successor. The present case is the only infringement suit, strictly speaking, which has been brought to trial where the validity of the Swan patents are in issue. The alleged infringements began as early as July, 1924, although technical infringement can only start with the issue of the first patent in April, 1925, and the trial of this case began in September, 1932.
- (2) Substantially all of the prior art testimony offered by the defendant in this case is stipulated into this record from the record of one or the other of the General Motors cases hereinbefore referred to, and all of the prior art exhibited by defendant here, except defendant's Ex. 384, a Murray & Tregurtha manifold assembly, was exhibited to one or the other of the tribunals which heard and decided the General Motors cases hereinbefore referred to.
- (3) In and about the year 1917 the gasoline furnished for the market became or was generally becom-

ing so low in volatility that manifolds for internal combustion engines were called upon to distribute wet fuel mixtures, which included particles of unvaporized or liquid fuel, from the carburetor to the several cylinders of the engine. These changing characteristics of the gasoline on the market as of about this time brought about a serious new problem, to-wit, the equal distribution of the wet or unvaporized constituents of the fuel mixture in its movement from the carburetor to the several engine cylinders. With the gasoline on the market since about 1917, the fuel mixture as it leaves the carburetor contains much liquid gasoline.

- (4) The problem of distributing wet fuel mixtures from the carburetor to the several engine cylinders was complicated by the vast difference between the density and volume of the liquid gasoline as compared with the air and vaporized gas in the mixture, and further complicated by the inertia of the liquid particles and the effect of centrifugal force acting to separate the heavier liquid particles from the vastly lighter air and gas constituents of the mixture; all of which tended to distribute different quantities of mixture including the liquid constituents to the various cylinders of the engine. The complications were increasingly aggravated as the number of cylinders of the engine was increased, as for example, from three to six cylinders. This problem was difficult and its solution was long sought by many eminent and distinguished engineers throughout the automotive industry. The existence and difficulties of the problem was recognized and known to exist long before Swan entered the field. This problem demanded solution and it is conceded here that whoever solved the problem achieved much and made an important invention.
- (5) No prior art manifold exhibited by defendant here effected or accomplished equal distribution of wet fuel mixtures, and no prior art manifold has the mode of operation of the Swan patented manifold and method, as described in the patents in suit. The Murray & Tregurtha prior art manifold, as operated on a three cylinder engine with automatic intake valves and with the riser and carburetor shown in defendant's Ex. 381, came nearer to getting equal distribution and operating like Swan than anything else in the prior art, but this combination of riser, header, branches and engine was different from defendant's and the patented one and was demonstrated by defendant, by the use of a header

made of glass, to fail to get equal distribution or realize the mode of operation described in the Swan Patents in suit. Defendant made no test or demonstration of the operation of any other prior art manifold or method.

- (6) The island type manifold similar to plaintiff's Ex. 48 is and was a prior art manifold in extensive commercial use at and prior to the time when the first Swan application for the patents in suit was filed and the island type manifold was used on all six cylinder engines by Buick Motor Company and The Nash Motors Company when Swan or plaintiff first exhibited and demonstrated the Swan patented manifold and method to them. The island type manifold has been generally discarded since Swan's entry into the field, and was abandoned by both Buick and Nash; The Nash Motors Company changing directly from the island type manifold to the
- manifolds herein charged to infringe. (7) For about seven years prior to July, 1923, both The Nash Motors Company and Buick Motor Company had used island type intake manifolds substantially like plaintiff's Ex. 48, on their six cylinder engines. During this period the engineers of The Nash Motors Company had been seeking to solve the fuel distribution problem by making improvements in the island type manifold, without departing from the general design thereof. In about July, 1923, the Buick Motor Company, acting under license from this plaintiff to General Motors Corporation, adopted the Swan manifold in its preferred form, particularly as to the cross-section of the header, and paid substantial sums in royalties to this plaintiff for the use of the Swan invention as embodied and carried out in that manifold. At about the same time, towit, in the summer of 1923, while The Nash Motors Company was continuing to make, use and sell the island type manifold, representatives of this plaintiff went to The Nash Motors Company and took with them and demonstrated to the Nash engineers and representatives a preferred form of the Swan patented manifold, similar to the manifold then commercially adopted by the Buick Motor Company. This manifold and others of similar construction, differing in size and "tailored" to fit various Nash engines, was demonstrated, tested and exhibited to the Nash engineers and representatives throughout the major portion of the year between July, 1923, and July, 1924. In this same period a manifold of the preferred form of the Swan patented construction

was exhibited to The Reeke-Nash Motors Company and installed on the personal car of Mr. Alfred Reeke, President of that company. Various representatives of this plaintiff spent many weeks and months during this period demonstrating, testing and exhibiting this manifold to The Nash Motors Company, its representatives and engineers. Many comparative tests were made between the Swan patented manifold and the island type manifold in the presence of plaintiff's representatives and the representatives of The Nash Motors Company. These tests included laboratory tests and various and extensive road tests, comprising such standard and accepted tests as acceleration, hill climbing, economy and general performance. The Swan patented manifold in its preferred form, as tested and exhibited in this period, was demonstrated to be a substantial and distinct improvement over the island type manifold.

(8) In about July, 1924, Buick Motor Company modified its intake manifold construction from the square preferred form of Swan's manifold to a rounded form like plaintiff's Exs. 6, 7, 9 and 10 here. At almost exactly the same time The Nash Motors Company abandoned the island type manifold, to which it never returned, and adopted on all of its six cylinder engines manifolds like plaintiff's Exs. 45, 45A, 46 and 46A. All of these manifolds, both Buick and Nash, embodied curved or partly curved recessed roofs or domes in the header opposite the riser. Later the Buick Motor Company again modified its construction by eliminating the recessed portion of the roof of the header, plaintiff's Exs. 8 and 11, and at about the same time The Nash Motors Company also modified its manifold construction in substantially the same way. (See plaintiff's Exs. 40, 43, 43A and 44.) In both the first and second General Motors cases the Buick manifolds, plaintiff's Exs. 6 to 11 inclusive, were held to come within the license contract between this plaintiff and General Motors Corporation, by virtue of the findings in both of those cases that such manifolds were the equivalent of the square or preferred form of the Swan patented manifold, and all of such manifolds embodied and carried out the Swan invention as disclosed in the original Swan application and as disclosed and claimed in such of the Swan patents in suit here as were before the tribunals which heard and decided those cases, and that all of those Buick manifolds were covered by some or all of the claims of at least patent No. 1,536,044 here in suit.

- (9) There has been extensive litigation involving the Swan patents in suit and the inventions disclosed and claimed therein, and the claims or some of them of the patent No. 1,536,044 in suit have been sought by others by interference proceedings in the United States Patent Office.
- (10) The Swan patented manifold as described and claimed in the patents in suit has gone into extensive commercial use, both in the square or preferred form and in the round and hexagonal form, and many licenses under the patents in suit have been granted by plaintiff to various automobile manufacturers and engine manufacturers. The several licensees having license under the patents in suit voluntarily paid royalties on more than 800,000 manifolds, including those of square crosssection, according to the preferred form of the patented manifold, as well as manifolds of rounded and hexagonal cross-section. In the first General Motors case, to which reference has previously been made, royalties were paid by judgment of the United States District Court for the Northern District of Ohio on more than 500,000 manifolds manufactured and sold by the Buick Motor Company, plaintiff's Exs. 9, 10 and 11 here.
- (11) The method invented by John W. Swan and patented in patent No. 1,536,044 in suit was based upon a new and original principle of operation, was disclosed in the original Swan application, Serial No. 501,314, or was so sufficiently set forth or suggested in that application as to constitute a sufficient basis for amendment to support the method claims 4, 5, 8, 9 and 10 of said patent. The said method described in said patent and applications and claimed in the claims of said patent, is carried out and practiced in the preferred form of the Swan patented manifold and in equivalent forms made in accordance with the disclosure and teaching of the patents in suit. Among the results achieved by the practice of the Swan patented method, there is realized an equal or substantially equal distribution of fuel mixture, including the liquid particles or constituents of the mixture, to the several engine cylinders along with other and resultant advantages.
- (12) Each of defendant's manifolds here charged to infringe, illustrated in plaintiff's Exs. 40 to 46 inclusive and 50, when mounted upon and operated with internal combustion engines such as the Nash engines, with which such manifolds were operated, embody the

aforesaid new and original principle of operation introduced by Swan and accomplished and carry out the said Swan patented method of fuel distribution in the manner taught in the patents in suit and as defined and claimed in claims 4, 5, 8, 9 and 10 of the Swan patent No. 1,536,044 in suit. In each of said defendant's manifolds there is realized and achieved or substantially realized and achieved the results and advantages peculiar to the Swan patented method including the result of equal or substantially equal fuel distribution. If any differences exist between the method employed in any of defendant's manifolds here charged to infringe and the patented method, such differences are merely a matter of degree and are immaterial.

- (13) Nowhere does the prior art, exhibited by defendant here, realize, disclose, or recognize the Swan patented method disclosed and claimed in patent No. 1,536,044 in suit or as practiced or carried out in defendant's manifolds here charged to infringe or any of them. No method is disclosed, taught, or recognized in the prior art which limits or restricts the method, claimed in claims Nos. 4, 5, 8, 9 and 10 of patent No. 1,536,044 in suit, in any manner whereby the method carried out and practiced in each and all of defendant's manifolds is not covered by each and all of said claims. No document in the prior art discloses the Swan patented method or discloses any method for obtaining the results and advantages accomplished by the Swan patented method and by defendant with its manifolds here charged to infringe. Swan is a pioneer in the patented method for distributing wet fuel mixtures as distinguished from dry mixtures and nowhere does the prior art show any recognition or realization of the solution of this problem which Swan solved by his patented method.
- (14) Nothing in the prior art restricts the Swan patented method as claimed in claims 4, 5, 8, 9 and 10 of patent No. 1,536,044 in suit to a manifold of square or rectangular cross-section as a means of accomplishment, as distinguished from a manifold of round or circular cross-section. Nothing in defendant's adoption of round construction, like the manifolds here charged to infringe or any of them, makes or causes the method carried out in such round manifolds conform to or embrace any prior method recognized, disclosed, or realized in the prior art.
- (15) Nothing in the prior art restricts the Swan patented method as claimed in claims 4, 5, 8, 9 and 10 of

patent No. 1,536,044 in suit to a manifold having sharp right angled inside corners or flat walls at the ends of the header, or a flat wall opposite the riser, as a means of accomplishment, as distinguished from slightly rounded inside corners or curved walls at the ends of the header, or a curved or partially curved wall opposite the riser as found in some or all of defendant's manifolds here charged to infringe; and nothing in defendant's adoption of the manifolds having rounded inside corners or curved or partially curved walls, as found in defendant's manifolds here charged to infringe, so modifies or changes the method carried out in such manifolds or any of them as to make that method conform to or embrace any prior method recognized or disclosed in the prior art, or to so depart or differ from the Swan patented method as to exclude the method carried out in defendant's manifolds from the patented method claims relied upon by plaintiff herein.

(16) The prior art, as it is exhibited by defendant here for the purpose of showing or attempting to show any method or process of distributing fuel mixture to an internal combustion engine, is the same or substantially the same as that which was exhibited in one or the other of the cases of the Swan Carburetor Company v. The General Motors Corporation hereinbefore referred to, and nothing here exhibited as to any prior method is more pertinent to the Swan patented method or more fully disclosed as ever having existed than were the method or methods, if any, employed in the prior art manifolds, which were offered and received in evidence in both of the said preceding cases involving the

Swan patents and inventions.

(17) The manifold apparatus and combinations invented by John W. Swan and patented in the patents in suit were based upon a new and original principle of operation, were disclosed in the original Swan application, Serial No. 501,314, and described therein as to structure, function and mode of operation, or so sufficiently set forth or suggested in preferred and modified forms in that application as to constitute a sufficient basis for amendment to support claims 11, 12, 13, 20, 22 and 23 of patent No. 1,536,044 in suit and claims 5, 7 and 8 of patent No. 1,636,721 in suit. The manifold apparatus and combinations described in the patents in suit and in the applications upon which said patents issued and claimed in the claims upon which plaintiff here relies, as enumer-

ated above, and embodying the Swan improvements patented thereby, obtain distinctive and advantageous results including, among other things, equal distribution of fuel mixture and the liquid particles and constituents thereof to the several engine cylinders, and particularly to the several cylinders of six cylinder engines, and operate as described in the patents in suit and function according to the teaching of the patents in suit.

- (18) Each and all of defendant's manifolds charged to infringe, as shown in plaintiff's Exs. 40 to 46 inclusive and 50, are so identical or so substantially identical in structure, function, mode of operation and results to the Swan patented manifold as defined in some or all of the claims upon which plaintiff here relies, that when operated as they are operated and used upon or in combination with defendant's engines, they perform the same or substantially the same function, have the same or substantially the same mode of operation, and achieve the same or substantially the same results as do the Swan patented manifolds, as described in the patents in suit and claimed in some or all of the said claims here relied upon by plaintiff. Such differences in structure, as may be found to exist in one or more of defendant's manifolds as compared with the preferred form of the patented manifold by reason of defendant's use of round construction as distinguished from square construction, or by reason of defendant's use of slightly rounded inside corners instead of sharp right angle inside corners, or by reason of defendant's use of curved or partly curved walls at the ends of the header and opposite the riser, are immaterial in that such departures as defendant has made in the structure of its manifolds, here charged to infringe, do not effect any substantial or material difference in function, mode of operation, or results in such manifolds as compared with the patented manifolds or the preferred form of the patented manifolds, and such differences as may be found are immaterial in that the effect of such changes and the extent of such differences are merely in matter of degree and are not differences in kind or substance.
- (19) The prior art manifolds, here exhibited by defendant, are the same or substantially the same as were exhibited to the tribunals that heard and decided the actions brought by this plaintiff against the General Motors Corporation hereinbefore referred to. Nothing exhibited by defendants here is more pertinent to the

patented manifold apparatus or combination or to the manifold apparatus or combination employed by defendant than were the prior art manifolds exhibited in the

preceding litigation.

(20) Defendant has produced no documentary evidence that any prior art device operated like or according to the Swan principle of operation, or performed the function, had the mode of operation or achieved the results of the Swan patented manifold, or defendant's manifolds here charged to infringe. None of the prior art manifolds exhibited by defendant here have the structure, function, mode of operation, or results of the Swan patented manifold apparatus or combination or defendant's manifold apparatus or combinations here charged

to infringe.

(21) Nothing in the prior art restricts the claims of the patents in suit heretofore enumerated, which define the apparatus or combination of elements patented therein to the preferred form of Swan's patented manifold with square or rectangular cross-section or with sharp right angled inside corners or with flat walls opposite the riser and at the ends of the header, and nothing in defendant's adoption of the manifolds here charged to infringe of round cross-section with slightly rounded inside corners and wholly or partly rounded walls opposite the riser and at the ends of the header, is in such accordance with any prior art manifold or the teaching of any prior art patent or publication or is in such accordance with any prior art construction with respect to function, mode of operation, or results that any of defendant's manifolds can be said to fairly differentiate from the patented construction or combination, or can be said to be made in accordance with or in substantial accordance with any manifold or complete combination shown to have existed in the prior art.

(22) Nowhere does it appear in the current state of the art relating to manifolds or methods of fuel distribution that anyone has brought forward a solution to the problem of fuel distribution or improved upon Swan's solution by any means not based on the Swan principle of operation. The adoption and use of the Swan patented manifold and method by licensees, paying royalties to this plaintiff, has increased and is increasing in proportion to all other manifolds made, used and sold in the whole automobile industry, including those manifolds charged to infringe in this and other suits brought by

this plaintiff.

- (23) At no time in the prosecution of either of the Swan applications Serial Nos. 501,314 and 747,991, or in the filing of application Serial No. 747,991, upon which the patents in suit matured, did Swan surrender anything or acquiesce in any limitation as a condition to the grant of the claims in the patents in suit whereby to exclude from the scope and effect of the claims, here relied upon by plaintiff, the manifolds or methods or any of them employed by defendant, and here charged to infringe. Such amendments as were made in the original Swan application Serial No. 501,314, either directly in that application or in or by virtue of the filing of the second Swan application Serial No. 747,991, were only in amplification and explanation of what was already reasonably indicated to be within the invention originally disclosed and described in the said original application. and said amendments indicated that Swan came to better understanding of the principles of his invention or inventions while his application or applications for the patents in suit were pending, and that he did no more than make his claims conform to and express his better and fuller understanding of the principles of his inven-The tribunals before whom the Swan invention or improvements and applications and patents were previously considered also considered the proceedings taken by Swan in the Patent Office, and the amendments therein made to the applications for the said patents in suit.
- (24) In the testimony stipulated into this record from the record of the first General Motors case of the testimony taken before Judge Westenhaver, plaintiff has adduced evidence here as to the method, function, operation and results carried out and achieved in the preferred form of the Swan patented manifold of square cross-section, plaintiff's Ex. 16, and a Buick manifold of round cross-section, plaintiff's Ex. 15, as measured by gas analysis tests, which tests demonstrated equal or substantially equal distribution of the fuel mixture including the liquid constituents thereof to each of the several engine cylinders of the six cylinder engine upon which the tests were made. Those tests were made inter parte in the trial of the first General Motors case and the testimony and exhibits concerning them were offered and received in evidence here without objection as to their being made ex parte to this proceeding.

In the instant case, plaintiff has made numerous road tests under actual driving conditions comparing one of

defendant's manifolds here charged to infringe, plaintiff's Ex. 42A, with a preferred form of the Swan patented manifold, plaintiff's Ex. 42B, and with a manifold similar to one of the Buick manifolds for which royalties were awarded by judgment in the first General Motors case, plaintiff's Ex. 42C. In these tests the performance and operation of the manifolds when mounted on a Nash six-cylinder automobile engine were compared in hill climbing, acceleration, fuel economy and general performance. The results of these tests showed that the three manifolds carried out the same or substantially the same method, operated in the same or substantially the same results, including equal or substantially equal

distribution of the fuel mixture.

The gas analysis tests made of record here by plaintiff are tests made to determine the performance of the individual engine cylinders with particular respect to the combustion therein, the products of combustion exhausted therefrom, and the equality or lack of equality of the fuel distribution effected by the intake manifold. Gas analysis tests are and were well known and generally accepted and practiced in the industry, and are and have been used by many automobile and internal combustion engine manufacturers for many years, including a period of time prior to the trial of the first General Motors case. The road tests of the kind and character performed by plaintiff here in the presence of the Master are universally used and accepted throughout the entire automotive industry for comparing and determining the performance, operation, results and achievements of intake manifolds. Road tests of the character made by plaintiff here are similar in kind to those made and relied upon by defendant in the first General Motors case.

Plaintiff's demonstration to the Master, under starting and actual road conditions such as hill climbing and acceleration, of a preferred form of the Swan patented manifold, plaintiff's Ex. 42D, having large glass windows in the roof and floor of the header and also opposite the riser outlet, wherein the appearance of the contents of the manifold was observed during the actual operation of the car, showed that the movements of the fuel mixture, including the liquid particles, were in substantial accordance with the disclosure and description of the function and mode of operation of the patented manifold and method, as set forth in the patents in suit and the

application thereof.

- (25) The Master finds that the plaintiff's demonstrations and tests have all been of the kind and character long accepted and universally adopted by the automotive industry as a whole for the purpose of determining the operation, performance and results of intake manifolds for and methods of fuel distribution to internal combustion engines, and have been previously accepted as standard and reliable tests by the tribunals which have previously heard and decided similar questions and issues concerning the inventions and patents in suit. All of plaintiff's tests, witnessed by the Master, were made on engines operating under their own power under normal driving and operating conditions with normal commercial manifolds and with fuel mixture ratios such as are commonly used in actual service operation, All of the road tests, including the visual tests or observations, were made on a car operating on the road under its own power with all conditions normal throughout such operation.
- (26) The Master finds that the tests made by defendant were new and consisted of laboratory tests only and showed the operation of forces and influences on the fuel mixtures, the actions of which were theretofore unknown to Swan, the patentee, or his expert counsel. This apparatus in the laboratory consisted of the manifold, defendant's Ex. 375, having transparent walls, operated with stroboscope demonstrations, with Neon lights, and following the tests moving pictures of the tests at different speeds were shown on the Court Room.
- (27) The Cox indicator is an instrument which has been in successful commercial use for automatically measuring and recording the pressures in the different cylinders of a gasoline engine, and was used in the tests in this case known as the Fulwiler and Detroit tests. By the use of this indicator, where the only variable is the mixture ratio, there is shown a changing of the mixture charge and how the manifold distributed such mixture, and in said tests differences in the effect of the manifold on distribution are shown, that is to say, such indicator registers the character of the mixtures as delivered to each cylinder separately, which seems to be an improvement over the gas analysis tests offered by plaintiff in this case.
- (28) The road tests made by plaintiff in this case, while having the sanction of the trade by long usage, did not test the character of the mixtures delivered to the different cylinders of the engine.

(29) The preferred "Swan method" as described in the patents is as follows: that at each successive cylinder aspiration, a uniform atomized mixture of air, gasoline vapor and liquid particles moves up the riser in straight lines, without swirling and without depositing liquid on the riser walls. The mixture strikes the flat ceiling of the header directly above the riser and at right angles to its direction of movement. From this surface the mixture rebounds and spatters, thereby creating "turbulence." The horizontal flatness, i.e., symmetry, of the ceiling with relation to the three outlets from the T, causes the impinging, the rebounding and the spattering not to favor, or deflect the mixture to, one outlet from the T rather than to another. The mixture "makes an abrupt right angle turn." When a center cylinder aspirates, the uniform mixture flows out through the center outlet. When an end cylinder aspirates, the mixture moves through the header in straight lines, impinges on the flat wall at the end of the header, rebounds and spatters and then moves into the end outlet. There are no accumulations of liquid in the manifold, and accumulations of liquid would militate against the carrying out of the method.

(30) The assembly, consisting of a Nash six-cylinder engine, a Swan square section manifold and a Marvel equipment comprising a riser containing the usual butterfly throttle, an exhaust gas jacket on the riser and a Marvel carburetor, is the typical assembly involved in this case; and this has been used in many of the tests made by the parties herein and may be called a Nash-Swan-Marvel assembly. The firing order of the cylinders of the Nash engine of the Nash-Swan-Marvel assembly

is 1-5-3-6-2-4.

(31) Observing and considering the tests and demonstrations made by both parties, the Master finds that the Swan patented manifold in its preferred and equivalent forms, and each and all of defendant's manifolds here charged to infringe, function, operate and earry out the Swan patented method in accordance with or substantial accordance with the teaching, description and disclosure in the patents in suit; and that Swan patented manifold in its preferred and equivalent forms, along with each and all of defendant's manifolds here charged to infringe, and the Swan patented method earried out with each of said manifolds, accomplish the results and advantages described and disclosed in the

patents in suit, including the result of equal or substantial distribution of the fuel mixture, including the particles of liquid gasoline contained therein, to the several engine cylinders.

- (32) The island type of manifold which preceded the Swan manifold, and with which Swan was compared by some, was inferior to the Swan manifold, that is to say, the Swan manifold was an improvement upon any of the island manifolds which was the highest development of manifolds before the appearance of the Swan manifold.
- (33) The principle of operation of the Swan patented manifold in its preferred form of square or rectangular cross-section is the same as in defendant's manifolds here charged to infringe of round cross-section. The operation of the manifolds is the same whether they be round or square in cross-section.
- (34) The abnormalities claimed by plaintiff in the construction of the manifolds (defendant's Exs. 325 and 375) used in the tests, being (1) a construction different at one end than at the other; (2) a fin found in the manifold (Ex. 375) unknown to defendant; and (3) a thermocouple claimed as an obstruction in the path of the mixture stream, had no appreciable effect upon the movement of the mixture, and were not of sufficient effect to materially change the results of the tests.
- (35) Various members of the National Automobile Chamber of Commerce have published or caused to be published advertisements proclaiming the utility and efficiency of the Swan patented manifold, and proclaiming that the Swan patented manifold achieved many distinctive advantages and results as evidenced by engine operation and car performance, and also achieved the novel, useful and distinctive advantage or result of affecting equal distribution of the fuel mixtures to the several engine cylinders of the internal combustion engines with which they were employed and used by said members. A great number of eminent and experienced engineers, who at first were doubtful and skeptical, later, after experimenting with the Swan patented manifold and method in operation with internal combustion engines under many and varied road and laboratory conditions in the usual course of their employment with various members of the National Automobile Chamber of Commerce, came to praise the Swan inventions or improvements and ad-

mit the utility and excellence of the Swan patented manifold and method, and proclaim the achievements and performance thereof, including the achievement of equal or substantially equal distribution of the fuel mixture

to the several engine cylinders.

(36) The National Automobile Chamber of Commerce is conducting the defense of this suit and its directors, acting on behalf of the Chamber, selected counsel and are paying the expenses of the suit. All of the members of the National Automobile Chamber of Commerce (see plaintiff's Exs. 57, 58, Stipulation Ex. 74 and Ex. 144) have contributed and are contributing to the expenses of this litigation according to an agreed system or systems. Among said members, The Nash Motors Company, Reo Motor Car Company, Willys-Overland Company, Chrysler Corporation, Plymouth Motor Corporation and Graham Paige Motors Corporation, paid their share of all the expenses of the said National Automobile Chamber of Commerce, including the

expense of this litigation.

(37) On or about June 19, 1925, plaintiff, The Swan Carburetor Company, served due and formal notice of infringement in writing, plaintiff's Ex. 47, upon defendant, The Nash Motors Company, by registered mail, directed to the attention of Mr. C. W. Nash, then President, and the same was received in the usual course of mail on or about the day following. Long prior to the writing of this formal notice of infringement, and long prior to the date of issuance of the patent No. 1,536,044 in suit, plaintiff through its representatives had advised the defendant, The Nash Motors Company, that it was seeking Letters Patent of the United States covering and protecting the Swan patented manifold and method as exhibited to The Nash Motors Company as early as the summer of 1923, and plaintiff by its President had long prior to the issuance of patent No. 1,536,044 entered into negotiations with Mr. C. W. Nash, President of The Nash Motors Company, to arrange a license for the manufacture, use and sale of manifolds embodying or carrying out the Swan inventions now patented in the patents in suit, and quoted to Mr. Nash the standard license or royalty rates obtained for such a license and expected from The Nash Motors Company in the event it made, used or sold manifolds embodying or carrying out said Swan invention or inventions under license from this plaintiff.

CONCLUSIONS OF LAW.

- (1) That the United States District Court for the Northern District of Ohio, Eastern Division, in which this suit was brought, has jurisdiction over subject matter of and parties to this suit.
- (2) That the Swan patents in suit, Nos. 1,536,044 and 1,636,721, and each of them are valid and describe, disclose and claim in claims 4, 5, 8, 9, 10, 11, 12, 13, 20, 22 and 23 of patent No. 1,536,044 and in claims 5, 7 and 8 of patent No. 1,636,721 new and useful inventions or improvements in intake manifolds for internal combustion engines and methods and means to facilitate the distribution of fuel mixture in internal combustion engines.
- (3) That the patent in suit, No. 1,536,044, is a basic patent and defines and covers a pioneer invention or inventions, and is entitled to a liberal interpretation and a broad range of equivalents.
- (4) That the patent in suit, No. 1,636,721, as to claims 5, 7 and 8, is subsidiary in rank to patent No. 1,536,044 and defines and covers a meritorious improvement and is entitled to a liberal interpretation and a substantial range of equivalents consistent with its rank and relation to patent No. 1,536,044.
- (5) That the method or methods of distributing fuel mixture practiced and carried out in each and all of defendant's manifolds here charged to infringe, illustrated in plaintiff's exhibits 40 to 46 inclusive and 50, when operated with the internal combustion engines for which said manifolds were made and with which said manifolds were used and sold is and was covered by claims 4, 5, 8, 9 and 10 of patent No. 1,536,044 in suit, and the practice of said method by the use of said manifolds on said engines constitutes and constituted an infringement of said patent with respect to said claims. The defendant, The Reeke-Nash Motors Company, aided and abetted by The Nash Motors Company, the other of the defendants named and identified in the original and supplemental Bills of Complaint, infringed the said patent and contributed to the infringement thereof with respect to said method claims as and in the manner alleged in the Bill of Complaint.
- (6) That each and all of defendant's manifolds here charged to infringe illustrated in the drawings, plaintiff's exhibits 40 to 46 inclusive and 50, as an apparatus or a combination with or for the internal combustion

engines for which said manifolds were made, and with which said manifolds were used and sold, are covered by claims 20, 22 and 23 of patent No. 1,536,044 in suit; the manifold illustrated as to header and branches in plaintiff's exhibit 41 is also covered by claims 11, 12 and 13 of patent No. 1,536,044 in suit; the manifolds illustrated in plaintiff's exhibits 40 and 43 are also covered by claims 5, 7 and 8 of patent No. 1,636,721 in suit; the manifold illustrated as to header and branches in plaintiff's exhibits 42, 45 and 46 are also covered by claims 7 and 8 of patent No. 1,636,721 in suit; the manifold illustrated as to header and branches in plaintiff's exhibit 44 is also covered by claims 5 and 7 of patent No. 1,636,721 in suit.

(7) That the defendant, The Reeke-Nash Motors Company, aided and abetted by The Nash Motors Company, the other of the defendants, named and identified in the original and supplemental Bills of Complaint, infringed and contributed to the infringement of said patents in suit with respect to the apparatus and combination claims as herein respectively designated and as and in the manner alleged in the Bill of Complaint and the

Supplemental Bill of Complaint.

(8) That the defendant here having appropriated the distinctive features and characteristics of the Swan patented inventions are estopped from denying the utility thereof, and apart from such estoppel the defense did not carry the burden by law imposed upon it to show lack of utility in the patented inventions or to show inoperativeness of the patents in suit or to show any material or substantial difference between the mode of operation of the patented inventions described in the patents in suit and actually carried out and embodied in the methods and manifolds disclosed in the said patents and in defendant's infringing methods and manifolds.

(9) That matter was not inserted in the applications upon which the patents in suit matured or either of them by way of amendment or otherwise, which causes any cloud upon the validity or scope of the patents in suit or

either of them.

(10) That plaintiff is not estopped by reason of any proceedings in the Patent Office in connection with the prosecution of the patents in suit from asserting the claims of the patents in suit, here relied upon, with the full range of equivalents to which they are on their face entitled in view of the state of the prior art.

- (11) The various members of the National Automobile Chamber of Commerce (plaintiff's Exs. 57 and 58) are privies to the defendant in this suit, and statements made by such members or by their engineers or representatives, acting in the usual course of their employment, are admissible in evidence here as admissions against interest made by privies of this defendant.
- (12) That the plaintiff is entitled to the relief prayed for in the Bill of Complaint and Supplemental Bill of Complaint and every part thereof as against the defendant, The Reeke-Nash Motors Company.
- (13) That the plaintiff have and recover the costs of this suit.

MEMORANDUM.

The validity of the Swan patents was not an issue in the *General Motors* cases, those suits being upon the license, by the owner of the patents against its licensee. The efforts of defendant were there confined to establishing and restricting the limits of the patents, while in the case at bar defendant contests the validity of the patents themselves.

While the decision in the *General Motors* case is not binding here as to the validity of the patent, comity at least requires that most serious consideration be given to the prior findings of the courts which have considered these patents.

PRESUMPTION OF VALIDITY.

At the outset the Swan method of manifolding is denied patentability by defendant Reeke-Nash Company on two grounds: (1) that what Swan sought to patent was not patentable; and (2) that he incorrectly described or failed to describe what he sought to patent.

The assumption must be that the claims of the patents are valid until the contrary is shown. The validity of the patent is presumed, and this presumption implies patentable novelty and utility. Westinghouse v. Formica, 266 U. S. 342, 348 (1924); as to novelty, Soderman Heat & Power Co. v. Kaufman, 14 Fed. (2) 392, 394 (CA 8, 1926), and as to utility, Boyce v. Stewart-Warner Co., 220 Fed. 118, 126 (CCA 2, 1914). We therefore start with the assumption that the claims in issue describing

the steps in the method and the apparatus are valid

over the prior art.

This presumption of validity is rebuttable and the question of validity is not to be confused with the question of the scope to be given the claims with which we are principally concerned, if the claims are found to be valid, and the question of infringement of defendant's devices then remains for determination.

PATENT CLAIMS FOR A METHOD OR PROCESS.

The method claims in issue of the first Swan patent are Nos. 4, 5, 8, 9 and 10, and it will suffice to quote claim 4 as typical of these method claims:

"4. A method of distributing a fuel mixture to an engine which consists in moving the mixture in a straight line to a zone from which it is distributed to a plurality of engine cylinders, directing said movement by forces which tend to distribute the mixture uniformly in all directions in a plane transverse to said movement, and further directing the movement of the mixture by forces tending to move it successively in a plurality of directions transverse to the original direction, to the cylinders."

The first step of this method is "moving the mixture in a straight line to a zone," namely, the T zone or so-called distributing zone of the riser. Defendant claims the mixture does not move in a straight line in the riser to this zone, but on the contrary moves in a turbulent, swirling spiral, being deflected by the carburetor intake

and jets and by the angularity of the throttle.

The next step of the method takes place at "the distributing zone," and is "directing said movement by forces which tend to distribute the mixture uniformly in all directions in a plane transverse to said movements." By Swan's theory the forces act upon the mixture at the T and distribute it uniformly in the front and rear header branches and into the center outlet. Defendant claims that there are no such forces but that the forces which do act on the mixture at the T do not have a uniform effect.

The Swan theory is that the mixture is a homogeneous mixture of air, vapor and liquid particles which move up the riser in straight lines, which theory defend-

ant asserts is wholly fictitious and imaginary.

Defendants further claim that the forces operating in the manifold cause an unequal distribution of the

liquid mixture in the manifold; that they enrich the end cylinders as compared with the center cylinders, that they enrich the inside cylinder of each end pair, and thus cause errors of unequal distribution which defendants have sought to demonstrate by showing an unequal performance of the different cylinders. The defense is grounded on the proposition that the claim is invalid because the method claimed by Swan is not performed by the Swan manifold.

The rule as to patents for a method or process is stated in Walker on Patents, 6th Ed., Sec. 160. "It is not essential that an inventor should understand or set forth the scientific principle upon which his invention works." A process has been defined as a mode of treatment of certain materials to produce a given result. This rule was early laid down by Mr. Justice Bradley in Cochrane v. Deener, 94 U. S. 780 (1876), where he said at p. 788:

"A process is a mode of treatment of certain materials to produce a given result. It is an act, or a series of acts, performed upon the subject-matter to be transformed and reduced to a different state or thing. If new and useful, it is just as patentable as is a piece of machinery. In the language of the patent law, it is an art. The machinery pointed out as suitable to perform the process may or may not be new or patentable; whilst the process itself may be altogether new, and produce an entirely new result. The process requires that certain things should be done with certain substances, and in a certain order; but the tools to be used in doing this may be of a secondary consequence."

Where a claim for a method or process not involving chemical change or change of substance, was held valid and patentable, and asserted the validity of a process having to do with hydrodynamics and simply dealing with the flow and control of fluids, Mr. Justice Blatchford in New Process Fermentation Co. v. Maus, 122 U. S. 413 (1887) said at p. 427:

"Within the rules laid down by this court in Corning v. Burden, 15 How. 252, 267, in Cochrane v. Deener, 94 U. S. 780, 787, 788, and in Tilghman v. Proctor, 102 U. S. 707, 722, 724, 725, we think that the method or art covered by the third claim of the patent is patentable as a process, irrespective of the apparatus or instrumentality for carrying it out."

A process patent was held valid for the dominant pool for the Bessemer Furnace in Carnegie Steel Co. v. Cambria Iron Co., 185 U. S. 403 (1902). The specification sought "to provide means for rendering the product of steel works uniform in chemical composition * * *" (p. 443), and as to this, the court said: "If it be true that this process cannot be carried on without infringing the Jones patent, he is certainly entitled to a monopoly of the invention."

In this circuit a patent for method of feeding water to boilers, based on the theory of retarding the lag and maintaining a variable constant, was held valid. Northern Equipment Co. v. McDonough Automatic Regulator Co., 300 Fed. 488 (1924), on page 491 Judge Denison says:

"If anyone before Andrews both observed and intelligently appreciated the factors involved in the variable constant theory and worked out his ideas into concrete form, it is not disclosed by this record, as we understand and interpret the testimony. Such prior appreciation of the theory as there was, if any, was vague and abstract,"

and comments upon the method claim in suit, page 492. Again in the purolator case, *Motor Improvement Co. v. General Motors*, 49 Fed. (2) 543 (1931), the Court of Appeals of the 6th Circuit held the Sweetland patent, relating to oil filters, valid and infringed, and considered

the method or process claims in its opinion.

In the recent case of Nestle-Le Mur Co. v. Eugene, 55 Fed. (2) 854 (1932), was involved a patent of machine claims for permanently waving hair, but there were no method or process claims involved in the suit. While the Court of Appeals reversed the District Court, Judge Hickenlooper goes on to state that process claims might have been valid, but such had not been made. The machine claims were invalid since they involved only the arrangement of old electrical apparatus which could be manipulated by any mechanic skilled in the art. The Judge quoted from Cochrane v. Deener, supra, and says at p. 857:

"The subjects covered by patents for a process and for a machine, although frequently related and in sense often founded upon the same mental concept, are nevertheless in substance independent and radically different. As clearly stated in the authorities here cited, 'a machine is a thing,' while 'a process is an act, or a mode of acting'; 'a new process is usually the result of a discovery; a machine, of invention.'"

HOW ACCURATELY NEED A PATENTEE DESCRIBE HIS DISCOVERY OR INVENTION?

Since it is established that a method or process is patentable, the question arises, how accurately must a patentee describe his discovery or invention. In the case at bar a method or process is involved, so following the authorities as pointed out by Judge Hickenlooper, the question here is, how accurately was Swan required to describe his discovery.

Walker on Patents states the rule "it is not essential that an inventor should either understand or set forth the scientific principle on which his invention works," 6th Ed., Sec. 160.

In his first application Swan stated "I have found it somewhat difficult to analyze the exact theory on which my discovery rests. " " Question then arises, if the method claimed by Swan is not an accurate description of what actually happens in the manifold, is his patent defeated and invalid. This brings us to a consideration of the rules as to how far courts will go in destroying a patent on the grounds that the inventor failed to sufficiently describe the forces which enter into the operation of his method or process.

Early in the administration of Patent Law the Supreme Court held in the *Telephone* cases, 126 U. S. 1 (1888) in the 2nd Syllabus: "In order to procure a patent for a process, the inventor must describe his invention with sufficient clearness * * * and must point out some practicable way of putting it into operation; but he is not required to bring it to the highest degree of perfection."

In this Circuit this question was raised in connection with the Jeavons Oil Burner, reported in Cleveland Foundry Co. v. Detroit Vapor Stove Co., 131 Fed. 853 (1904) where defendant sought to destroy the patent by asserting that the inventor did not describe with sufficient definiteness the forces which entered into the operation of the Jeavons Burner. In that case Judge Severens said, at p. 855:

"A burner made according to their construction would operate in the way to be expected from the

claim. * * * But he (Jeavons) did see and know that the burner he had devised would successfully accomplish the results he anticipated and was laboring for. * * * But the fact is that, by constructing the burner in the manner prescribed by him, (Jeavons) the vapor is produced and distributed to and in the combustion chamber in a very satisfactory and useful way. That it is a successful improvement on all former methods is shown by the general adoption of it by the public, no less than 122,000 burners of this kind having been sold within 2½ years. It may be that the patentee did not fully understand the rationale of the manner in which his construction effected the results, and it may be that expert witnesses have not in all respects correctly apprehended it. But if the fact be that his construction does effect the results and they are beneficial, he is none the less entitled to the benefit of his invention though he may not have correctly understood the principles of its operation. Andrews v. Cross, 19 Blatchf. 294, approved in the Driven Well case, Eames v. Andrews, 122 U. S. 40, 55 (1887)."

Many forces, such as the force of gravity, centrifugal force and inertia, act and persist and are understood by those skilled in the arts. The rule is summarized by the Supreme Court in *Diamond Rubber v. Consolidated Tire*, 220 U. S. 428 (1911) which involves rubber tires, where Mr. Justice McKenna says, at p. 435:

"And how can it take from his merit that he may not know all of the forces which he has brought into operation? It is certainly not necessary that he understand or be able to state the scientific principles underlying his invention, and it is immaterial whether he can stand a successful examination as to the speculative ideas involved. (Citing the Driven Well case, supra, Cleveland Foundry Co. v. Detroit Vapor Stove Co., supra, and others.) He must indeed make such disclosure and description of his invention that it may be put into practice."

Mr. Chief Justice Taft expressed the same thought when he said, in *Eibel Process Co. v. M. & O. Paper Co.*, 261 U. S. 45 (1923) at p. 63:

"Infringement exists if the claim fairly reads upon the defendant's device which may not be exactly the one described and if it approximates it nearly enough so that it may be said to be an equivalent thereof. The range of equivalency is to be determined in the light of the state of the art and the advancement made therein."

Thus specifications and claims are addressed to those skilled in the art and a claim should be liberally construed. Sun Ray Gas Corp. v. Bellows-Claude Neon Co., 49 Fed. (2) 886 (C. C. A. 6, 1931). In the recent case of National Battery Co. v. Richardson Co., 63 Fed. (2) 289 (1933), the Court of Appeals of the 6th Circuit, in the 3rd Syllabus says that "where the inventor had mental concept of a new composition of matter to achieve a desired result * * * the invention consisting of the mental concept." While this patent was for a composition on the questions of the sufficiency of the disclosure and that patents are addressed to those skilled in the art, Judge Hickenlooper says, at p. 293:

"The specifications and claims are addressed to those skilled in the art * * * that which is, and was understood to be, necessary to make the claim operative may then be implied therein, provided always, that the description of the claim and the specification is sufficient to enable one skilled in the art, with the specifications and claims before him, and without the necessity of further experiment itself of an inventive nature, to practice the invention

of the patent."

DID SWAN SHOW ANYTHING NEW, AND IF SO, WAS THIS INVENTION?

Often it is difficult to determine whether invention exists in an apparatus or method which is essentially an improvement upon the prior art devices or means for securing similar results. There seem to be no sure tests which can be applied in all cases.

The question is one of fact to be determined by the weighing of evidence in the light of decisions of the courts upon analogous states of facts where rules have

been declared which seem to be applicable.

Attention has been called to the recent case of Newcomb, David Co., Inc. v. The R. E. Mahon Co., 59 Fed. (2) 899 (1932), where the Court of Appeals of this Circuit held that invention does not exist in merely aggregating or "making judicious selection from" the devices of the prior art, each designed and utilized to accomplish

its individual purpose at a time and in a place where such function is necessary for the operation of the whole, and Judge Hickenlooper said, p. 901:

"This is but the exercise of the mechanical ability reasonably to be expected in the development of the art, and has repeatedly been held insufficient to evidence invention, whether such decision be placed upon the ground of aggregation or upon the lack of an exercise of the inventive faculty. Concrete Appliances Co. v. Gomery, 269 U. S. 177. * * * And compare: Sachs v. Hartford Electric Supply Co., 47 Fed. (2) 743, 748 (C. C. A. 2) where Judge Learned Hand criticizes the promiscuous use of the term 'aggregation,' and says that in every case 'invention must depend upon whether more was required to fill the need than the routine ingenuity of the ordinary We think that this statement perhaps craftsman.' requires too little, but certain it is that something more is required than even a highly skillful selection of well-known means from the prior art to progressively perform their several functions. * Doubtless the conveyor design of Mahon, certainly as embodied in the commercial practices of the complainant, has met with favorable reception and has gone into broad use. Doubtless, also, it is a more serviceable conveyor than had theretofore been placed upon the market; but we fail to find in its underlying concept that spark of inventive genius which alone can distinguish it from an exercise of mechanical ability reasonably to be expected from the pneumatic engineer, and which alone would justify a patent."

Just here is where it seems that the courts must determine the question of invention in each case as presented. Does the underlying concept of Swan contain

the spark of inventive genius?

If it does contain such spark of inventive genius then in connection with the presumption of patentability and failure to find anticipation in the prior art, leaves no alternative but to find the patent valid. The question is one of fact to be determined by the evidence, which persuades me that Swan displayed inventive genius. Perhaps the result is the determining factor in the process of arrival at such conclusion. Swan did show a manifold which gave better gas distribution, which was a

matter of great importance in the building of automobiles.

Swan saw what others did not, that the gasoline continued as a liquid in the air stream up the manifold, that whether the gasoline globules adhered to the inner surfaces of the manifold or rolled along the bottom, these globules must be broken up to secure even distribution, and his contribution was a manifold with rectilinear lines and right angle turns. This was a novel method and new in the art with Swan; in short, this was his invention.

In Pyrene Mfg. Co. v. Boyce, 292 Fed. 480 (1923) at p. 481 in an opinion of the 3rd Circuit, Judge Woolley said:

"On the major issue of validity we shall first inquire whether the conception for which the patent was granted involves invention. Because of the lack of a definite rule, questions of this kind are often perplexing. It is a trite saying that invention defies definition. Yet, through long use, the word has acquired certain characteristics which at least give direction to its meaning. Invention is a concept; a thing evolved from the mind. It is not a revelation of something which exists and was unknown, but is the creation of something which did not exist before, possessing the elements of novelty and utility in kind and measure different and greater than what the art might expect from its skilled workers."

Swan's was a concept which conforms to this definition of invention.

THE ACHIEVEMENT OF THE SWAN MANIFOLD.

The defense of the Nash Company against the Swan patent is bottomed upon one premise; that Swan accomplished nothing in the art of manifolding, in fact that the Swan invention is not an advance, that it is not an achievement.

Yet from the writings of Tice in 1911 down until after the Swan patents appeared, the existence of the manifold problem has been of great concern to automotive engineers. It is even admitted that it would be a great achievement to produce an increase in power or a saving in fuel of as much as 2 or 3 per cent.

Before the advent of Swan the island type of manifold as used by Nash had been improved upon over a period of years by Engineer Wahlberg of the Nash Com-

pany and brought to its highest efficiency (Trans. p. 405). In 1923 the Swan engineers made comparative tests at the Nash plant with the Nash manifold and a Swan manifold, on a Nash engine, which showed favorably for the Swan manifold, following which the Nash engineer said that "Swan has made a real contribution to the industry" (Trans. p. 48), and following the suggestion of Mr. Nash, plaintiff did national advertising in 1925 to familiarize the public with its Swan manifold (Trans. 50).

In the letter of Engineer Taub of the General Motors Corporation (plaintiff's Ex. 26), March 22, 1922, he said after tests had been made by General Motors that:

"As far as we have tested the Swan type of manifold, we are positive that this construction has many advantages over the accepted practice of today. The distribution has proven as perfect as can be made by manifolding, and the vaporization is practically complete.

In every test that we have made using the principles shown in the Swan manifold, this has been

borne out."

The commendation of this letter was given before Gen-

eral Motors had taken a license.

Others from Buick Motor Company who had commendation for the Swan manifold were Mr. Sage, Pence, Experimental Engineer, and Bassett, then President and General Manager of Buick, and DeWaters and Bower, Chief and Assistant Engineers of Buick, and Hartz, Engineer of Buick Testing Laboratory. In addition, there was Mr. Reuter, President of Olds Motor Works and Mr. Baker, Chief Engineer of Willys-Overland, and references to their statements are found in briefs of counsel.

H. L. Horning, a manufacturer of gasoline engines

and an expert motor engineer, states that:

"The art of building six-cylinder engines might be said to revolve about better valve materials until some better form of manifold could be designed," (Trans. 23e) "and after spending a hundred thousand dollars in trying to produce a good manifold, and research, and so forth, and consideration of the results we got, it seems to me that the simplicity of the Swan manifold is a very important thing "because of the saving in the cost of construction of the usual manifold," (Trans. 23f) "and finally this Swan manifold is better than anything we have seen before." (Trans. 23i.)

Thus many automobile engineers accepted the Swan manifold and have said that it was an improvement upon the old island type of manifold. Buick took its license, proceeded to manufacture, and without cancelling sought to manufacture a manifold which it claimed was not within the bounds of the patent. Such claims were denied in the first General Motors case and are now pending in its second case.

After General Motors took this stand other members of the National Automobile Chamber of Commerce proceeded to manufacture, after experimenting with the Swan manifold, and suits are pending against Willys-Overland and Reo. Several engine manufacturers took licenses and there was an acceptance of the Swan mani-

fold as an improvement.

Engineers and engine manufacturers have accepted the Swan method as an improvement over the old forms of manifolding and wherever contest was made, it was on the ground that they did not use the Swan method. In this case for the first time has the proof been offered that the so-called Swan method of manifolding is non-existent, and the basis for this, of course, is the elaborate tests and testimony of Mr. Tice. Before this case there has been no proof offered either in publications or by tests showing with such accuracy and clearness the actual operation of the forces in a manifold.

Even if there were no other evidence before the court than the tests and testimony of Mr. Tice, the value and importance of Swan's invention and its title to be rated as an important invention would seem to be clear, for in his 1911 articles (plaintiff's Ex. 37) all of the statements which he now affirms (Trans. 1059) set forth the want, the need, the problem, its difficulties, and the failure of its solution notwithstanding the many efforts to improve manifolds as shown in his writings. The later work of Tice at the Stewart-Warner Company in efforts to find the solution of the manifold problem, resulted in patents which have been launched into the trade. While he has testified to many things and clearly shown and analyzed the operation of the forces and the actions of mixture in the manifold, it must be still said that Swan did add to the solution of the manifolding problem, that while he may not have secured scientifically "equal distribution," he did secure "good commercial distribution" in the operation of his manifold. So that under the heading of utility the Swan invention has met the test of invention prescribed by the patent courts.

TESTS AND EXPERT TESTIMONY.

The tests upon which plaintiff relies include the usual road tests, that is, acceleration, hill-climbing and economy. Spark plug tests and gas analysis tests were also offered in evidence. Expert testimony for plaintiff was given by Frank L. Sessions who testified in the General Motors cases, Kirkham, engineer for plaintiff, and President Pelton of the plaintiff company. Generally speaking, in offering its testimony, plaintiff covered the same ground as in the General Motors cases and much of the testimony from those cases was stipulated into this record.

Defendant also relies upon the record in the General Motors cases for most of its evidence as to prior art, the only new evidence being as to the 20th Century manifold. For its defense to the patents, the new evidence upon which defendant principally relies, is the expert testimony and tests made by or under the supervision of P. S. Tice. This is the same P. S. Tice whose article on the prior art appeared in "Motor" of May, 1911, and Judge Westenhaver, in Swan Carburetor Co. v. General Motors Corp., supra, said "his description of the existing art in manifolds and of the problems involved may be accepted as correct."

The tests conducted by Tice in the Master's presence at the factory of the White Motor Company showed the performance of liquid gasoline at the elbow of manifolds. Also later at the same factory, he operated another test on a Murray & Tregurtha engine with a glass window on The Cox indicator tests at Detroit were its manifold. made under the supervision of Tice and results became a part of his testimony. The tests made with the Cox indicator used a delicate, scientific apparatus, the record sheets of the tests being in evidence. To better show the operation of the forces, test apparatus was operated by Mr. Tice with Neon lights and stroboscope, and the record contains two reels of moving picture film showing the manifold in operation driven by a dynamometer.

In addition to Mr. Tice as a practical carburetion engineer, defendant relies upon Professor Cooley of the University of Michigan, Dean Emeritus of College of Engineering, a scientist who testified as to the behavior

of flowing liquids.

With these tests made by defendant, an explanation is offered of the problem involved in the operation of forces in a manifold. The facts were developed and shown in the actual operation of test apparatus and probably were publicly viewed for the first time. There was no such proof offered in the General Motors cases, as the record shows. The operation of the forces as pictured by defendant's tests was unknown to plaintiff's expert, Sessions, and could not be described by him (Trans. 195) for he says "the exact action of mixture is measurable only by results, so far as I know " * ". We know what it performs, but we don't know the manner by which it performs it."

The operation of the forces in the manifold was also unknown to Swan, as appears from the first statement of his original application for patent, where he

states his inability to describe such forces.

With the Tice tests offered by defendant, showing operation of forces in a manifold, has this new evidence destroyed the Swan patents? Judge Westenhaver said that the Tice 1911 description of the existing art and manifolds might be accepted as correct, and that Swan sought to solve the problem Tice had stated and discussed; and he found that Swan solved the problems involved "by introducing a new and original principle of operation. The gist of his invention consists in bringing the gaseous mixture from the carburetor to the header in perpendicular or straight lines, then abruptly changing its course at right angles in the header, and then again changing its course at right angles from the header into the branches."

Judge Westenhaver goes on to say that all other features of Swan are subsidiary, that while he might have stressed a dome or flat wall, the recesses in the outer bend, flat or level floors, or even square cross-section, such were not made by Swan as the substance of

his invention.

THE NEW PROOF AS TO METHOD AND OPERATION OF FORCES IN A MANIFOLD OFFERED IN THE TICE TESTS AND THE SWAN CLAIMS TO INVENTION.

Distribution of the liquid gasoline to the various cylinders is the function of any manifold. "Equal distribution" of such gasoline is the claim of the Swan patents.

Defendant claims that the description of the entire mode of operation of the Swan manifold is incorrect as stated in the patents and that the record fails to show that either Swan or plaintiff's experts described or understood the actual operation of the mixture in a manifold. Plaintiff asserts that patents in suit describe the operation and that its experts have testified sufficiently as to this (Trans. 104-109, 1334 and 1530).

Relying upon the Tice tests, particularly those made with a Cox indicator, known in this record as the Detroit tests and the Fulwiler tests, defendant urges that a Swan manifold on a Nash engine (plaintiff's Ex. 375) distributes gas unevenly to different cylinders, and so fails to effect the "equal distribution" essential to the "Swan

method" of the patents.

Plaintiff's answer is in substance, that no matter what some delicate, scientific laboratory apparatus may show as to any variation of gasoline as received and recorded upon the aspiration of any individual cylinder, the effect is that the Swan manifold gives "good commercial distribution," which in itself is invention; was unknown in the prior art, and is an improvement on the prior art; and which defendant has appropriated with-

out license and is now an infringer.

With the help of most delicate electrical apparatus in the laboratory, Mr. Tice has shown every step, in fact every instant, in the travel of gasoline from carburetor nozzle, past the butterfly throttle up the riser, around the bends, into the header, around another bend into the branches, and finally into the cylinder for use in the separate aspiration of each cylinder. These globules of gasoline move at "hurricane speed," varying with the engine speed which operates at 800, 1200 or 1800 revolutions per minute, at the rate of 120 miles per hour at 1200 R.P.M. (Trans. 1169). Most complete is the Tice analysis of these operations, by charts, diagrams and photographs of operations, which were viewed in the tests at the White plant, with and without Neon lights. Finally two moving pictures of the tests are articulated in one film so that the audience may have before it at one time, in a single view, a birdseye view into the top of the manifold and a view into the side, showing side. by side the two views of the interior of the manifold, as the mixture containing particles of gasoline is sucked in for each separate aspiration of the six cylinders.

Without attempting to describe the different phenomena pointed out by Mr. Tice in a single cycle of the

six aspirations of the several cylinders, which include gasoline on riser walls, its behavior at the T, the eddies at the corners or bends, the hot and cold blow-backs, the impingement or failure to impinge of liquid gas at the ends, the action of the valves and the quick reversals of the flow of mixture as different cylinders operate, the claims of operation as shown by the Tice proof must be considered as against the claims for the Swan method of the patents.

Counsel for defendant claim for the Tice proof that it establishes:

- (a) That while Swan claims to start with a homogeneous mixture of gas particles and air and that such character of the mixture is maintained until delivered to the different cylinders, defendant denies that the mixture of air and gas is homogeneous to start with and never becomes homogeneous.
- (b) That the mixture does not move up the riser in rectilinear lines but has an inherent turbulent motion with deflections due to carburetor intake, nozzles and throttle, which prevent movement in rectilinear lines; that because of the swirling motion most of the liquid is deposited on the walls of the riser where it accumulates unevenly and is blown up the riser in uneven streams.
- (c) That the square shape of the Swan riser does not prevent the swirling of the mixture, which Tice shows does swirl and deposits liquid unevenly on the riser walls.
- (d) That the mixture, on reaching the top of the riser, does not impinge on the flat surface of the header above the riser and that the Swan method ignores what Tice shows, that the mixture stream bends around the corner at the top of the riser in a curved path and does not impinge upon the ceiling; yet there is proof that the liquid globules of gasoline in the mixture do strike the top of the header at or near the riser, and this is a scientific fact based upon the action of inertia, for the liquid gasoline being heavier than the air part of the mixture as the turn is made, is thrown against the header due to the force of inertia. The result is the impingement, so-called, of the plaintiff's patent and its effects were to be seen in all tests viewed by the court.
- (e) That the mixture, when it reached the T or the so-called distributing zone, makes a right angle turn, is challenged, because of the speed of the mixture and the

pulling force, the mixture is shown by the pictures to bend as it changes direction at the right angle turns of the manifold, and the Tice tests show the path of the mixture in curves as large or as "sweeping" as the diameter of the manifold will permit.

- (f) That there is no spattering or rebounding of the particles of gasoline in the mixture at the turns, although such descriptive words fairly well describe what is seen in the tests made, which were observed in this case and the General Motors case, and were accepted by Judge Westenhaver and the defendant in that case; only in the new tests made by Tice with the aid of Neon lights and stroboscope other phenomena appear and spattering and rebounding are not the only visible results of the effects of the forces in operation.
- (g) That the liquid accumulates in eddies and forms puddles or reservoirs in the header and center branch at points just beyond the corners at the top of the riser; which eddies or accumulations were first shown by Tice tests and are ascribed by plaintiff's expert to the turbulence of the mixture and such eddies or accumulations flatten out and practically disappear when there is a change of direction in the flow of the mixture as it is pulled from one end of the engine to the other as the different cylinders aspirate, which change of direction is also accompanied by the hot and cold blow-backs, and the Tice tests show that there is some variation in the richness of the mixture as received by the end cylinders compared to the center cylinders.
- (h) That after the mixture leaves the T it does not flow in rectilinear lines to the branches, is untrue for practically all of the liquid particles of the mixture are on the walls and such as are in the air stream at the T immediately come into contact with the walls to which they adhere.

(i) That the liquid particles are not projected beyond the sharp inside corners at the ends of the header and are not remixed in the gas stream, for Tice says that the liquid is substantially all on the walls.

(j) That the absence of liquid accumulations of the Swan method is untrue, for Tice points out eight places where accumulations or reservoirs of liquid assemble due to eddies.

(k) That such equality of distribution as has been obtained by Swan has been due to the application of

heat on the exhaust jacket which has produced evaporation in the riser, but for which heat application there would be larger accumulations of liquid in the header and branches; and that whatever commercial success the Swan manifold has had, has been due to this application of heat to the riser, which vaporizes most of the liquid before it reaches the T, so that this vapor mixes with the air and is evenly distributed to the cylinders.

(1) That increased economy is not obtained by the Swan manifold since its lack of equal distribution requires in practice the setting of the carburetor rich enough to bring up to the necessary richness cylinders that run lean, and this practice produces an unnecessary richness in other cylinders and causes fuel waste.

Defendant urges that there is no proof of equality of distribution by the Swan manifold; that the only way to test equal distribution of liquid by a manifold to each individual cylinder is to test the mixture in each cylinder separately from the mixture of other cylinders, and to establish this claim the new proof of the Tice tests is offered.

Defendant urges that commercial success, acquiescence by the taking of licenses, or statements of engineers skilled in the art do not establish the Swan method or that the mixture is equally distributed as against proof tendered in the Tice tests; further, that road tests evidence only the over-all performance of the engine and give no information as to the method or quality of the distribution.

As before stated, the court must weigh the evidence and consider the effect of the new proof offered by Mr. Tice in this case.

The motion pictures show particles of the mixture striking the roof of the header opposite the riser (plaintiff's Exs. 117-123 incl.). Even if this be only a part of the mixture, yet it is in the method of the patent and is a phenomena described by Swan and one which has been shown in all tests heretofore made.

The stroboscopic demonstrations on the glass manifold at the White Plant showed the liquid particles hitting the roof of the header opposite the riser, and liquid particles were also seen hitting the roof of the header opposite the riser at the road demonstration, with a glass manifold on plaintiff's test car.

The elbow demonstrations with and without the stroboscopic lights demonstrated movement at the turns,

notwithstanding the controversy between experts as to the presence of turbulence as contrasted with eddies and accumulations. Particularly as to the Murray & Tregurtha manifold, with a glass header, it was apparent in the tests that the mixture was unevenly distributed for greater quantities of liquid flowed to the front of the header than to the rear, and confirmed the testimony of the failure of the Murray & Tregurtha manifold to give equal distribution. Colchester (Trans. 1409), Kirkham

(Trans. 1427), and Sessions (Trans. 1543).

Finally, while Tice has shown much new information as to the phenomena of the movement of the mixture in the manifold which was unknown before the tests offered in this case, it cannot be said that the concept of Swan did not add something new to the art of manifolding, so that his patents may now be denied because of the new proof offered by the Tice testimony in this case. While his method may not effect "scientifically equal distribution," he did give "commercially equal distribution," and made an advancement in the art of manifolding.

DEFENSES TO THE PATENTS IN SUIT.

Defenses to the patents in suit urged by counsel are indefiniteness, functional claims, belated amendments to enlarge scope of application, contentions as to the file wrapper, and anticipation of method claims of first Swan patent, which will be considered in order.

The Defense of Indefiniteness is urged and seems to be on the proposition that Swan patents do not describe all the forces which tend to distribute the fuel mixture. Yet the law seems to be, if the applicant states fully enough the scientific principles and the forces involved in the operation of his method, that he is considered to have solved a problem and be entitled to a patent.

The law only requires as a condition for protection that the world be given something new and that the world be taught how to use it. *Diamond Rubber v. Consolidated*, 220 U. S. 428, 435 (1911). The rule is stated in *Walker on Patents*, 6th Ed., Sec. 218, pg. 292:

"It is enough to describe one particular mode and one particular apparatus by means of which the process may be performed with at least some beneficial result." While it might be said that Swan did not completely and scientifically define his process or method, he defined them sufficiently to meet the requirements of the patent law. He did describe the apparatus in which the method could be performed. The patent drawings show to one skilled in the art not only one apparatus, but a preferred apparatus and modified forms for carrying out his process. Mr. Sessions, for the plaintiff, summarized this (Trans. 1522):

"In fact, my opinion that the Swan patents adequately and accurately describe the structure and operation of the Swan inventions, has been made stronger by my observations of Mr. Tice's demonstrations, both of the glass manifold, the transparent manifold on the engine, the moving pictures and the operation of the engine at Detroit."

The Defense of Functional Claims is urged on the basis that the claims do not say what the forces are or how they are to be identified, which distribute the mixture uniformly in all directions. The rule seems to be that the method claims are valid, even though functions may be recited in them.

The function of the Swan machine and the Swan method is equal distribution of the mixture. This function is not recited in any of the claims in suit, and if it were such claim would not be functional unless patentability depended upon recitations of the function.

For instance, in claim 9 the steps are the moving of the mixture to the T from which it is distributed in three directions and subjecting the movement to forces which distribute the charges alternately in each direction in a plane transverse to the original movement. These are steps in the method and not in the function, which is the distribution of charges to the cylinders in equal proportions. The method or process of this claim is typical and is the orderly succession of movement of the fuel mixture to the T, changing its direction of movement at right angles and alternately sucking the mixture from the T, first in one of three directions and then in another.

Swan discovered that the effect of centrifugal force "acting to throw the liquid particles out of the intended aggregate line of travel, and thereby separating the mixture constituents," gave unequal distribution in the prior art manifolds. His method proposes, pg. 2, line 23, first

patent, "the liquid particles in the air fuel mixture instead of being thrown in a direction not intended, as at some curve, are influenced to move in a proper direction and thereby the mixture will be delivered to all the cylinder ports substantially alike." Thus by the effects of centrifugal force and inertia, he claims for his method the successive steps of moving the mixture from one point to another, i.e., through the T with its turbulence or its adjacent eddies, and thus from one stage of remixing to another. Swan uses those forces for his new purpose, but does not seek to claim the use of old and well-known force. Thus with such known forces as the suction from the engine and the inertia of the fuel particles, Swan discovers a method by which substantially equal distribution of the constituents of the fuel mixture was effected between the several cylinders of the engine.

So that in this case, as in New Fermentation Co. v. Maus, 122 U. S. 413 (1887), where a similar argument was made, this is a mode of treatment to produce a given result and the patent requires certain things be done with certain substances and in a certain order, and is

therefore a process or art.

The Defense of Belated Amendment Which Seeks to Enlarge the Scope of the Application: Counsel urge that Swan described and claimed the square section manifold and disclaimed the round section in his first application. Yet he illustrated a manifold round in cross-section and described and claimed such a manifold. Disclaimers are in the nature of estoppels and only apply where the intention to abandon is clear and unequivocal. Nothing less will prevent the resort to the doctrine of equivalents.

Winans v. Denmead, 15 How. 330 (1853).

In considering the disclosure of the original Swan application, it is to be remembered that patent specifications and other disclosures are directed to those skilled in the art. Without further considering the measurements, figures and descriptions of the patent, it suffices to say that it does not matter whether the Swan application shows a round manifold or not, so far as this ease is concerned. Professor Cooley has stated that the making of the manifold round instead of square would not make any difference (Trans. 1180). Even if the patent only showed a square manifold, infringement would exist under the doctrine of equivalents. Societe v. U. S., 224 U. S. 309, 328 (1912).

That the Swan method was disclosed in the original application was held by Judge Westenhaver and by the Commissioner in the *General Motors* cases, and recently, in considering the Commissioner's report in the second *General Motors* case, Judge Hahn said on this subject:

"It is enough that the language at pages 243 (14-25) and 244 (11-16) suggest a principle or method of operation, (or a sufficient basis for amendment) not dependent upon specific form of device, and no language of the specification directly or by implication excludes the possibility that the essence of Swan's invention may be a principle or method of operation not dependent for its successful operation upon any particular embodiment as to form."

The authority urged by counsel, Railway Co. v. Sayles, 97 U. S. 554 (1878), holds that new matter could not be added which was at variance with the original; in this case the holdings have been that the method was

disclosed in one original application.

That a patentee may amend his specification from time to time, making no additions in substance or material variations from the original disclosure, is well established; *Michigan Carton v. Sutherland Paper Co.*, 29 Fed. (2d) 179 (C. A. 6, 1928), where Judge Knappen said, at pg. 184:

"The rule is that insertions by way of amendment in the description or drawing, or both, of a patent application do not invalidate the patent, if they are only in amplification and explanation of what was already reasonably indicated to be within the invention; and this rule applies with special force where the insertion was required by the Patent Office. General Electric Co. v. Cooper, etc., Co., (C. C. A. 6) 249 F. 61, 64, certiorari denied 246 U. S. 668, 38 S. Ct. 336, 62 L. Ed. 930. And if an inventor comes to better understanding of the principles of his invention while his application for patent is pending, an amendment of his claim to conform thereto does not introduce any original matter nor enlarge his invention, and is within his legal rights. Cleveland, etc., Co. v. Detroit, etc., Co., (C. C. A. 6) 131 F. 853, 857, et seq.; Proudfit Co. v. Kalamazoo Co., (C. C. A. 6) 230 F. 120, 141."

It hardly comes with good grace for a member of the National Automobile Chamber of Commerce to charge that the plaintiff has interfered with their manifolding business. The record shows that when manufacturers were struggling with the old island and other types of manifolds, that Swan showed them the advantages of the Swan manifold which would handle a wet mixture better than had ever been done before. At expense to plaintiff, defendant was taught the merits of the Swan invention and manifolds were "tailored" to operate on defendant's engines. And now, plaintiff is entitled to protection for its patent, from infringers who have copied the Swan manifold.

File Wrapper Contentions: Defendant urges that the essence of the invention as Swan originally conceived it lay in a square or rectangular cross-section manifold with flat bottom, flat ceiling and flat surfaces against which the mixture could impinge, with the avoidance of liquid accumulations and the absence of curves, both in cross-section and in the direction of the flow of the mixture. Defendant asserted similar limitations for plaintiff in the General Motors cases. Yet on such broad disclosure in the first instance Swan should not now be estopped to assert the broad construction of the present patented claims. Examination of the Swan file wrapper could not lead one to believe that Swan intended to limit himself as defendant urges. Of the meaning and effect of patent claims, Walker on Patents, 6th Ed., Sec. 219, says:

"To use the words of the Supreme Court, 'the claims measure the invention,' and 'apprise the public of what is still left open to them'."

and in Section 234:

"Likewise a patentee of a manufacturer is not restricted to a construction which he describes in the specification merely as 'preferable' unless specifically limited by the claims."

If, as defendant urges, the essence of this invention was the square manifold or flat bottom, the avoidance of curves and the avoidance of liquid accumulations, such issue as to supposed limitations was disposed of in each of the *General Motors* cases and has heretofore been commented upon.

Method Claims of the First Swan Patent are not Anticipated: Defendant urges that method claims 4, 5 and 8 are anticipated in the Murray & Tregurtha manifold if these claims be construed to cover defendant's "Special Six" manifold which is asserted to be identical in shape with Murray & Tregurtha, also method claims 9 and 10 are urged as literally anticipated by Murray & Tregurtha.

The burden of proof that the prior art devices of Murray & Tregurtha operate like Swan and realize the Swan method of operation is ever upon the defendant. The rule is that the burden rests upon the defendant to prove that the prior art device operates like the patented device or like defendant's device. Coffin v. Ogden, 18

Wall. 120 (1870).

Defendant cannot escape this issue for, as stated by Judge Westenhaver in Fulton v. Bishop & Babcock, 284 Fed. 774 (1922), and again in the 6th Circuit, 17 Fed. (2) 999 (1925) in the same case, Bishop & Babcock v. Fulton, 37 Fed. (2) 293 (1930), the second syllabus is: "Patentee of process is entitled to have patent construed broadly enough to cover the meritorious thought of his process." The opinion is by Judge Moorman, and for this rule he relies upon Tilghman v. Proctor, 102 U. S. 707, 728 (1880), and Eibel Process v. M. & O. Paper Co., 261 U. S. 45, 63 (1923).

Defendant relies upon the rule of *Knapp v. Morss*, 150 U. S. 221, 228 (1893), that what would infringe if later would anticipate if earlier. Judge Westenhaver thought that the Matheson manifold was the nearest to the Swan, and the proof is here lacking that the Murray & Tregurtha manifold is identical with Swan in respect to performance, mode of operation and achievement. Defendant also urges that the 20th Century manifold and the Fiat also anticipated the method claims, and what has been said here as to Murray & Tregurtha ap-

plies equally as to these.

PRIOR ART.

All of the prior art relied upon in this case was relied upon and considered in one or both of the *General Motors* cases. The conclusion there reached was that

The Swan Patent is a Pioneer in Manifolding.

The manifold art was illustrated and discussed in the articles by Mr. Tice in Motor (plaintiff's Ex. 37) for April and May, 1911, and the Swan principle of manifolding seems to have met the difficulties experienced by inventors and manufacturers of gasoline engines. Gordon Form Lathe Co. v. Walcott Machine Co., 32 Fed. (2) 55 (C. A. 6, 1929), Byers v. Keystone Driller, 45 Fed. (2)

283 (C. A. 6, 1930).

The opinion of Judge Westenhaver, with the affirmance of the Court of Appeals, states the rule that patents are to be construed according to the order of importance and the degree of the advance in the invention patented. Any doubt as to the scope or the effect of the patent should be resolved in favor of the patentee, with increasing liberality where the patent is basic and marks a great advance in the art, as Mr. Chief Justice Taft said, in *Eibel Process v. M. & O. Paper Co.*, 261 U. S. 45 (1923, pg. 63):

"In administering the patent law, the Court first looks into the art to find what the real merit of the alleged discovery or invention is and whether or not it has advanced the art substantially. If it has done so, then the Court is liberal in its construction of the patent to secure to the inventor the reward he deserves * * * the application of the rule 'ut res magis valeat quam pereat' has been sustained

in so many cases in this Court."

The prior art relied upon consists of

(1) Patents in Exhibit 398, 29 in number, which were cited by the Patent Office Examiner in one or other of the Swan applications and were relied upon and exhibited to the court in the first General Motors case.

(2) Other Patents and Publications, in the second General Motors case, which included patents to Sundh (defendant's Ex. 394) and Koken & Pichl (defendant's

Ex. 395).

(3) Manifolds Shown in Exhibit 380, 6 in number, not shown in patents, all of which were in the second General Motors case and some in the first case. Considering these prior art items, all of the patents in the first group relied upon are paper patents which have had no commercial use (Trans. 1582). While a paper patent may anticipate, yet if it never found commercial favor, it has little force and credit on the question of non-invention. Republic v. Youngstown, 272 Fed. 386 (C. C. A. 6, 1921), Wellman v. Cramp, 3 Fed. (2) 531 (C. A. 6, 1925), and Gordon v. Walcott, supra.

From the large number of manifolds used, many are illustrated in the Tice articles, some in Exhibit 380, and

Matheson is shown in both the Tice articles and in Exhibit 380. The record does not show that any of the 6-cylinder manifolds of the Tice articles or of Exhibit 380 were in production when Swan entered the field, except perhaps the Fay & Bowen and the Franklin, which manufacturers later adopted the Swan manifold. Of the users of 6-cylinder manifolds illustrated by Tice, only three, Franklin, Pierce Arrow and Oldsmobile were still in business at the time of the trial (Trans. 1059) and these three became licensees adopting the Swan manifold (Trans. 31).

The record fails to show that anyone, except defendants contesting the Swan patent, has ever claimed that the prior art manifolds employed the Swan mode of operation. In this case Mr. Tice testified that none of the manifolds in defendant's Exhibit 380 employed the Swan mode of operation and that none of them realized

equal distribution (Trans. 1084).

Since the manifolds of defendant's Exhibit 380 are conceded by the experts of both parties to be those nearest to Swan, all evidence of other manifolds in patents or publications loses its probative effect if those of Ex-

hibit 380 fail as to prior art.

The rule is that the burden is on the defendant to show that the prior art device operated like the patented device and performed its functions. Defendant must show that the prior devices it produced are "capable of producing the results sought to be accomplished," as required in Coffin v. Ogden, 18 Wall. 120 (1870). Defendant cannot escape this issue for, as stated by Judge Westenhaver in Fulton v. Bishop & Babcock, 284 Fed. 774 (1922), and again in the 6th Circuit Court of Appeals, 17 Fed. (2) 999 (1925), in a Per Curiam opinion on rehearing, pg. 1007 (1927), anticipation is not effected by an arrangement which was not adopted and used to perform the function which was performed in the patented invention. So, as the Supreme Court said in Coffin v. Ogden, supra, "the burden of proof is upon defendant to prove these things, and every reasonable doubt should be resolved against him." Defendant must prove that prior devices were capable of and adopted or used to perform the Swan functions or embody the Swan principle of operation. The record is clear, that if any of the manifolds of the prior art ever did operate like Swan or realize equal distribution, such was accidental and unrecognized.

That the Swan method might have been performed by one or another of the prior art manifolds if operated under certain conditions is no answer; for the rule is well established that a method or process cannot be anticipated by a device in which it might have been performed. Carnegie Steel Co. v. Cambria Steel Co., 185 U. S. 403 (1902); Nestle-LeMur v. Eugene, 55 Fed. (2) 854 (C. A. 6, 1932).

Murray & Tregurtha Manifold. Experts for both parties in this case agree that this manifold comes nearest to looking like Swan and when placed on a 3-cylinder engine as it was used, ought to come nearer than others to doing what the Swan manifold does on a 6-cylinder engine. The experts also agree that fuel distribution to a 6-cylinder engine is more difficult than distribution to a 3-cylinder engine (Trans. 1179), so if Murray & Tregurtha solved the problem that Swan solved, with the 3-cylinder engine, the Murray & Tregurtha manifold would not necessarily anticipate one who solved the more difficult problem of the 6-cylinder engine. Tests of the Murray & Tregurtha glass manifold (defendant's Ex. 382) failed to show equal distribution on a 3-cylinder engine, so there is no need for the court to speculate as to what could be done on a 6-cylinder engine. It would seem to be sufficient to say that the Murray & Tregurtha manifold cannot be held to anticipate Swan because there was no problem of distributing the mixture at the end of each of the branches.

Fiat manifold. Of the 6-cylinder manifolds, Mr. Tice as defendant's expert, picked the Fiat manifold as best of all. This is based on the testimony as to a Fiatmanifold-Greuter-carburetor device which is claimed to anticipate Swan. The Fiat manifold (defendant's Ex. 272) with the testimony of Rowan (Trans. 1480-81, 1490) shows efforts to correct fuel distribution, failure, and that the Italian experts were called to remedy trouble with the manifold, which efforts were unsuccessful. The most that can be said for the Fiat manifold is that, as modified by the witness, it can only rate as one of several prior efforts and failures to do what Swan did.

Matheson Manifold. In the first General Motors case Judge Westenhaver picked Matheson and Peerless as the best of the manifolds in the prior art, following the testimony of plaintiff's expert, Mr. Sessions, to the same effect. Also in the second General Motors case defendant's expert, Schwartz, considered the Matheson manifold to be the best.

The Matheson manifold is also one of the 76 manifolds illustrated in the Tice article in which he says that

they fail to effect equal distribution, and commented upon the inability of the devices of the then existing manifold art to equally distribute the fuel mixture. The faults of the Matheson manifold were testified to by several witnesses. Dean, who had operated a Matheson car, said the center pair of cylinders, 3 and 4, fouled and were apparently getting more mixture than others (Trans. 1395-6). Parker, who had operated a Matheson car with Matheson manifolds in 1911, said the motor was never smooth or flexible and missed when running slow (Trans. 1400). Greuter, who had been a Matheson engineer and knew the Matheson manifold, said that on tests he had made the cylinders connected to the center branch would invariably get more gas than the end ones (Trans. 1402). The Matheson manifold, like the others, must rate as a prior effort and failure instead of a device anticipating the Swan invention.

Pierce Arrow Manifolds. Two types of Pierce Arrow are relied upon (defendant's Ex. 252), and the modified Pierce Arrow shown in Exhibit 249 (also

shown in Ex. 380).

These manifolds were used upon one of the finest and highest priced cars, its engineering and equipment being considered of the highest order. The manifold shown in defendant's Ex. 251 was unsatisfactory, and witnesses were called to show how the standard Pierce Arrow manifold was improved, yet the Pierce Arrow manifold as modified is not considered as close to Swan as Matheson or Peerless by any of the experts. These also must be regarded as a prior effort and failure before the advent of Swan.

Fay & Bowen Manifold. This manifold (defendant's Ex. 229) was also presented in the trial in the General Motors case, and the proof it offered was considered by Judge Westenhaver only as cumulative. This manifold was also used on marine or other 6-cylinder engines, and its performance was inconsistent with any claim of the Swan principle or result, for Ware said "the Swan manifolds were very much better" (Trans. 1438, 1442). This also represents a prior effort and failure.

New York Yacht & Engine Manifold (20 Century Manifold). This is shown in defendant's Exhibits 380 and 268. Testimony is meager and fails to show that it realized the Swan principle or the Swan results. It can only be classed as a prior effort which does not anticipate.

INFRINGEMENT.

The Nash Company, like many other automobile manufacturers, had been using the island type of manifold for several years (Trans. 404). After the plaintiff conducted experiments at the Nash plant, showing the improvement to be effected by the Swan manifold over the island manifold, Nash adopted the manifold which is claimed to be the Swan manifold, there being this difference, the manifold as adopted was of round cross-section instead of square, which Professor Cooley says makes no difference in operation. This manifold became standard equipment with Nash and defendant has never gone back to the island manifold since the change was made.

That the manifolds adopted by Nash (plaintiff's Exs. 41-A, 42-A, 43-A, 45-A and 46-A) and disclosed in drawings (plaintiff's Exs. 40 to 46 incl.) operate like and get the same results as Buick manifolds (plaintiff's Exs. 9, 10 and 11), which Buick manifolds were held to infringe in the General Motors suits, is the testimony of Engineer Wahlberg, Vice-President in charge of Engineering of the Nash Motors Company (Trans. 418, 419, 427, 428). The qualifications of Engineer Wahlberg are not in question. A strong case is one which can be proved by cross examination of opposing witnesses, said Mr. Chief Justice Taft, Eibel Process Co. v. M. & O. Paper Co., 261 U. S. 45.

Such result is further confirmed by the testimony of plaintiff's experts, and the outdoor tests which included economy, hill-climbing and acceleration tests. These are the standard tests accepted by the automobile and internal combustion engine industry for testing manifolds, carburetors and equipment to determine operation and relative performance. The challenge of the defendant is that such standard tests should now be discarded in favor of the laboratory tests as conducted by Mr. Tice on manifolds driven by a dynamometer and tests with a

Cox indicator.

The broad claims in suit, Patent No. 1,536,044, claims 4, 5, 8, 10, 20, 22 and 23, are infringed for the same reasons that they were infringed by the manifolds in the

two General Motors cases.

The method claims of the first patent cover what Judge Westenhaver characterized as "the new and original principle of operation" which Swan invented. Some of these claims cover a 3-step method and some of

them a 2-step method, and some are limited to a sixcylinder engine. Claim 10 is typical, is limited to a sixcylinder engine, employs a 3-step method, which are the characteristics of the defendant's manifolds charged to infringe. The claim may be analyzed into various steps, as follows:

- (1) "A method of distributing a fuel mixture to a six-cylinder engine which includes moving the mixture to a zone through which it is distributed in three directions in a plane transverse to said movement,
- (2) subjecting said movement to forces tending to distribute charges in alternating directions and in uniform character in all of said directions, and
- (3) further subjecting the movement of the mixture towards adjacent pairs of cylinders to forces tending to qualify the charges for said pairs in substantially equal portion of wet mixture constituents."

The opinion evidence and the tests of plaintiff show that defendant's manifolds employ all of the steps recited in this claim, and defendant denies that the Swan manifold so operates.

Notwithstanding defendant urges that the claims are invalid because the method claimed is not performed by the Swan manifold, plaintiff must prevail on this issue which has been considered in the discussion of the

law on the subject.

Improved Performance of Infringing Device, No Defense. It would not avail defendant if it had established that the Swan manifold with the round cross-section performs better than the Swan manifold with a square crosssection. This is only a matter of degree and the same claims were made by witnesses Sage and Bower in the General Motors cases as to the Buick manifolds there held to infringe.

The performance and operation of the Buick manifolds tested with the Swan was so clearly alike that they could not be fairly distinguished (Trans. 128-157 and 187-88), which is also supported by the admission of witness Sage as quoted by witness Pelton (Trans. 1229).

The rule is that where there is a mere improvement on the device, that infringement can never be avoided by thus improving the patented device and making it work better. This rule is stated by Mr. Chief Justice Taft in *Temco v. Apco Co.*, 275 U. S. 319 (1928) at pg. 328, as follows:

"It is well established that an improvement cannot appropriate the basic patent of another and that the improver without a license is an infringer and may be sued as such." Cochrane v. Deaner, supra, and other cases.

DEFENSE OF LACHES.

Defendant urges that plaintiff has been guilty of laches in the prosecution of this suit filed late in 1926 and brought to trial in September of 1932. Before considering the application of such principle to this patent cause, a review of the steps taken in the litigation over the pat-

ents in suit seems necessary.

The bill of complaint in this cause and the petition in the first General Motors case were both filed in November, 1926. The General Motors case was heard by Judge Westenhaver in April, 1927, and judgment entered on September 27, 1927; decision in the Court of Appeals was had in June, 1930, and rehearing denied November 5, 1930, after which Writ of Certiorari to the United States Supreme Court was denied January 12, 1931.

By stipulation of counsel this case was dropped from the trial calendar in May, 1927. The second patent in suit was issued in July and the plaintiff restored the case to the trial calendar, filing a supplemental bill of

complaint in September, 1927.

Following Judge Westenhaver's decision in the General Motors case, on November 12, 1927, counsel moved to reopen the General Motors case, claiming newly discovered evidence in the Murray and Tregurtha matter, and on the 18th of November amended its answer in the case at bar by adding such new matter to its defenses here.

This case was on the calendar ready for trial; parties stipulated parts of the General Motors record as appears by plaintiff's Ex. 25; and any part of the General Motors record that either party desired was to be used in this case. After Judge Westenhaver's death in 1928, by consent of counsel the case was again dropped from the trial calendar during the appeal of the first General Motors case and the case was not reinstated until October of 1929.

On November 18, 1929, his Honor, Judge Jones, ordered this case be passed pending the decision of the Court of Appeals in the General Motors case, and the first General Motors case was concluded by the denial of

Writ of Certiorari in January, 1931.

Meanwhile the second General Motors case had been filed and was set for hearing April 15, 1931, and awaiting the outcome of this second case, counsel stipulated an extension in the case at bar until May, 1931. Also in May defendant amended its answer to include the 20th Century manifold as used by it and by General Motors as an alleged prior use. Also, defendant offered two more amendments in May, 1931, regarding Fiat and other manifolds, to which amendments plaintiff made no objection but asked delay of trial until the newly asserted defenses could be investigated. Counsel thereupon agreed that the case be dropped from the trial calendar.

Trial of the second General Motors case began in the Fall of 1931 and the case was submitted to the Commissioner late in the Spring of 1932. After the testimony was concluded in that case, the case at bar was reinstated on the trial calendar and the order of reference to the Master bears date of May 26, 1932. After the reference the Master stated to counsel for both parties that he would not proceed with the trial of this case until the General Motors case then on hearing was concluded. The Commissioner's report was filed with the District Court on August 15th, and after several conferences with counsel about proceeding to trial, the first testimony in this case was taken on September 28, 1932.

Counsel for defendant rely on the leading case of Johnston v. Standard Mining Co., 148 U. S. 360 (1893), where it was stated that the mere institution of a suit does not relieve from the charge of laches and that if plaintiff fails to diligently prosecute the action that the consequences are the same as though no action had been

egun.

Counsel further rely upon Kellogg Switchboard & Supply Co. v. Dean Electric, 231 Fed. 197 (1915), where Judge Clarke cited Johnston v. Standard Mining, supra, and stated that plaintiff had shown such lack of diligence in the prosecution of its claim that it deserved no relief in a Court of Equity, and further stated that "laches is a defense which can be made without any pleading to support it." There seems to be no analogy between the

facts of that case and the case at bar for there the plaintiff did absolutely nothing for a period of ten years. In this case the plaintiff has been busy prosecuting matters concerning this patent and defendant has acquiesced in delays except the delays which have followed upon Court orders.

Defendant has not pleaded laches as a defense and has offered no support for such defense, whether pleaded or otherwise, and under the new equity rules it seems is not entitled to raise a defense not pleaded. Walker on Patents, 6th Ed. Sec. 632, pg. 728:

"The defense of laches could formerly be made in a demurrer, or in a plea, or in an answer, or in an argument on the hearing without any pleading to support it. Of course now this defense can be made only by answer or motion to dismiss accordingly as the situation permits."

The rule also seems to be that a mere lapse of time alone does not constitute laches, 48 Corpus Juris, 331. Accompanying the lapse of time in the case at bar has been a litigation against others for royalties under licenses concerning the patents in suit. While it is true that the validity of the patents could not be attacked in such suits, the attack made by the defendant there was based upon the same prior art and the same kind of defenses raised in the case at bar. Delay in the prosecution of other suits for infringement of the same patent. 48 Corpus Juris, 333, citing Plecker v. Poorman, 147 Fed. 528 (C. C. Ohio, 1905), U. S. Mitis v. Detroit, 122 Fed. 863 (C. C. A. 6, 1903).

Laches like any other equitable defense must be maintained in equity and good conscience. Here the defense is admittedly maintained by the National Automobile Chamber of Commerce, of which General Motors Corporation, defendant in the prior cases has been a member prior to the beginning of all litigation on these patents (plaintiff's Exs. 57-8). The several members of the Chamber contribute to the defense of patent suits which are defended by that body. Reo v. Gear Grinding,

42 Fed. (2) 965 (C. C. A. 6, 1930).

Such being the relationship between General Motors and Nash Motor, the real defendant here, both being members of the Chamber, plaintiff should not be penalized and this defendant cannot be heard to take advantage of a situation created by one of its privies, where

plaintiff elected to pursue the General Motors and establish its rights on issues which also arise in this litigation. In Frank V. Smith v. Pomeroy, 299 Fed. 544 (C. C. A. 2, 1924) Judge Manton says at pg. 547:

"" * " that the appellant was excused for the delay in suing for infringement by reason of the previous Yates litigation, taken in connection with the concurring circumstances above described. We regard these facts and circumstances as justifying an appeal to the conscience of a court of equity as a sufficient excuse for the delay. Such delay should not work to the advantage of one who has fraudulently and deliberately infringed, and who has stood behind and actively participated in a stubborn attack upon the validity of the patent by another litigant. They should not profit by the appellant's helpless condition, nor be permitted to escape from the results of their wrongdoing."

CONCLUSION.

This case for the first time tests the validity of the Swan patents. In the second *General Motors* case the Commissioner concluded his report with this statement:

"Judge Westenhaver, upon mature deliberation, found that Swan sought to, and did solve the problems in the existing art in manifolds by introducing a new and original principle of operation. He found the gist of the Swan invention to consist in bringing the gaseous mixture from the carburetor to the header in perpendicular or straight lines, then abruptly changing its course at right angles in the header, and then again changing its course at right angles from the header into the branches. Having before him the judgment and the opinion in the former case, with the affirming opinion on appeal by the 6th Circuit Court of Appeals, the Commissioner would be presumptuous, indeed, to attempt to set them aside, or even not to give full effect to these judgments."

Notwithstanding the new proof offered in this case, the so-called Tice tests which have shown better the phenomena of the action of forces in a manifold than it has ever been shown before, the Swan patents are found to be improvements giving "commercially equal distribution," if not "scientifically equal distribution," and are

entitled to the protection of the court.

Many protracted hearings have been held in this proceeding and the testimony has covered a wide range. Tests were made which the Master attended and there observed the operation of manifold apparatus, and the results of the tests are offered in evidence. Some of the evidence has been received over objection, so that the court may have before it all of the claims and the proof offered by both parties. Claims of new issues in this case, supported by new evidence, have been heard at length by the Master, for it was believed by all parties that a full and complete hearing should be had in this proceeding.

The Master reports that on the 30th day of June, 1933, he handed draft copies of this report to counsel and asked that errors and corrections to be made be pointed out by counsel by July 12th, 1933, that the Master might consider and make such corrections insofar as the Master believed proper and in keeping with the views as expressed in the report. Such suggestions have been received and corrections made in the report, and thereafter, again on July 25th, 1933, draft copies of the corrected report were handed to counsel with the request that errors and corrections to be made be pointed out by August 3rd, 1933, and such suggestions have been received and the corrections made. Two copies of this report have been furnished to counsel for each party.

Herewith I hand up for your Honors the following:

- (1) Original files and papers from the Clerk of the Court.
 - (2) Stipulation.
- (3) Transcript of testimony, together with plaintiff's exhibits Nos. 1 to 168, inclusive, and defendant's exhibits Nos. D-201 to 410a inclusive.
 - (4) Briefs of Counsel.
- (5) Suggested Findings of Fact and Conclusions of Law submitted by counsel.
 - (6) Report of Special Master.

Respectfully submitted,

WM. B. Woods, Special Master.

August 21, 1933.



On Manifolds and Distribution.

How the Manifold Action Is Limited By and Must Coordinate With the Carburetion. Why It Is That All of the Cylinders of An Engine Are Not Served Equally.

By P. S. Tice.

THE matter of distributing the mixture to the cylinders of an engine by a those who have set themselves to coolee a "pipe" that would be sensibly perfect in its single piping system or manifold has slways been one of considerable interest; and distributing action have learned some very interesting and important things. With the coming in and increasingly more general use of the six-cylinder engine, the problem assumed more serious aspects than had been and experience that some of the earlier types, notably the two-cylinder opposed, were very the case in the supply system of the fourthough it is a matter of common knowledge "difficult," to say the least, because of defective manifolding.

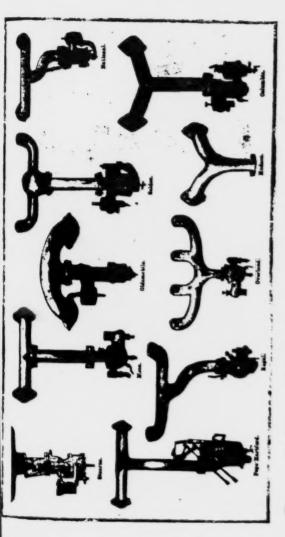
bustion chambers of an engine are made all The irregularities of motor action growing out of the use of a piping system that is de-ficient as a distributing device are many and of a sire, so that the compression pressures cylinders is of great importance, since upon pressions, it is obvious that, given synchron-ous ignition and the same quality of mixture in each of the cylinders, the relative values be identical in each, and the result will be a sult conducive to smooth, quiet action. But if most annoying. In the first place, the comshall be of the same value in each. This equality of compression pressures among the action. Considering only the relative comof the maximum and mean cylinder pressures depend upon the compression pressures. If these latter are of the same value in each cylinder, the pressures upon combustion will series of equally spaced equal pressures—a reations in torque reaction and the variations in the sounds of the several exhausts. It is a sensation of sound in the muffled exhaust of smoothness" of the running the cylinder pressures are variable among themselves, neither smoothness nor quiet will be had, because of the consequent irregular variwell established fact in muffler design that the it depends the



an engine is due to the fluctuations in the presture of the exhaust—the wider the fluctuation the greater the sound, and vice versa.

The "limping" sound of the exheast is merety amonging, and is in itself of no great consequence. But the suveral cylinders is a matter of contevpernee. Its effects are most atrough felt when the enquire is operative as a low or medium speed under full load. And it is manifest by an increasing proneness to whirstion—the wheatien of torque reaction, which has nothing whatever to do with the running or rotative balance of the engine—as when fulling hills or running in sand. Very naturally such running is inefficient running since forque reaction variations are not not maily caused by increases in the effective cylinder pressures, but by reductions in them induced by in this case, compression lossed due to cylinder leakage to the cylinder leakage to the cylinder leakage to the cylinders.

inertia and are so mobile that, as far as quonis a very bad design indeed that will so dis-tribute or fail to distribute as to cause a Of course, if the passages to sir, and not as a distributor of "mixture," it sures of the cylinders. Gases have so little illative distribution is concerned, there is but sages are practically equal in length and the bends in each are equal in number and mean radius, and the effective areas are the same At this point it should be said that, considering the manifold as a distributor of gas. notable variation among the compression preslittle to choose between the forms of piping some of the cylinders are much more tortuous or restricted than those to the other cylinders, less charge will be aspirated by the former cylinders, with a reduction in the available compression pressures. But if the pasthroughout each of them, there can be no difficulty arising because of unequal quantitative Of course, the straighter the several pas-



Distribution. Manifolds and

How the Manifold Action Is Limited By and Must Coordinate With the Carburetion. Why It Is That All of the Cylinders of An Engine Are Not Served Equally.

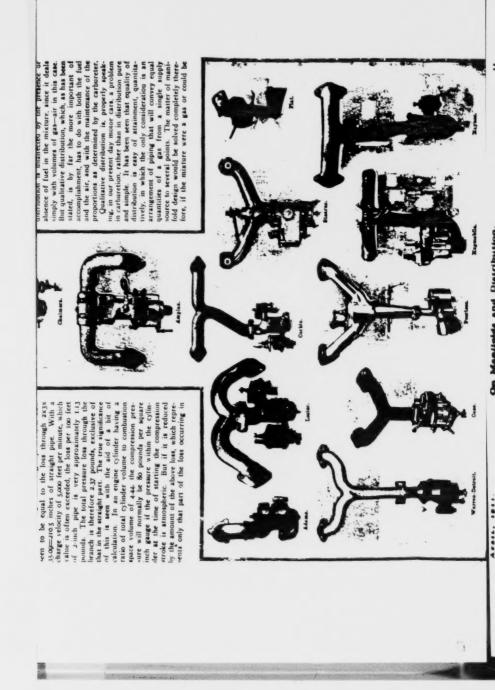
By P. S. Tice.

HE matter of distributing the mixture to the shipper system or manifold has always been one of considerable interest; and those who have set themselves to cooke a distributing action have tearned some very interesting action have tearned some very interesting action have tearned some very interesting and important things. With the common tear of contract and interesting and important things. With the of the six-sylinder regime, the problem as ununed more serious aspects than had been the case in the supply system of the fourthough it is a maiter of common knowledge.



an engine is due to the fluctuations in the presture of the exhaust—the wider the fluctuation the greater the sound, and vice versa.

The "limping" sound of the exhaust is mereby amonging, and is in itself of no great consequence. But the unevenness of the torque reactions of the several cylinders is a matter of consequence. Its effects are most strongly feit when the engine is operating at a low or medium speed under full load. And it is manifest by an increasing proneness to



the manifold branch, the compression will be but 54,8 pounds.

headled, the greater will be the quantity of mixture that can be aspirated by each of the cylinders particularly under the condition of high speed, when this matter becomes of prime importance as determining the power output and efficiency of the engine. It is interesting experiments conducted for the purpose of As tabulated by the experimenters, the loss due to a single go deg. bend, the mean radius pipe, in terms of the pipe diameter, imposing in this latter connection to note the results of determining the losses in pipes due to bends of the bend being stated in terms of the diameter of the pipe forming the bend, is expressed as an equivalent length of straight and the more reasonable the proportioned to the quantity the same loss:

Mean radius of bend:

75 100 145 1.50 4.00 3.00 5.00 121.4 35.09 17.51 12.72 10.36 9.03 8.24 7.85 Length of straight pipe:

rice), the loss will be equal to that in a length radius of the bend, in the table above. Let us equal to 75 of the pipe diameter—very ap-proximately the average value employed. The resistance or loss through each branch, neglectof this is seen with the aid of a bit of For the sake of pointing the significance of these figures, let us take as an example an of a-inch straight pipe represented by axaxthe assume that the mean radius of each bend is wen to be equal to the loss through 2x3x charge velocity of 5,000 feet per minute, which value is often exceeded, the loss per 100 feet of a onch pipe is very approximately 1.13 branch is therefore 2.37 pounds, exclusive of is three (about the minimum found in pracnumber under that representing the mean st. op=210 g inches of straight pipe. With a pounds. The total pressure loss through the The true significance calculation. In an engine cylinder having a ratio of total cylinder volume to combustion number of 90 deg. bends in each passage between the carbureter and the valve port itself ing that through its straight portion, is now space volume of 4.44, the compression presure will normally be 80 pounds per square ler at the time of starting the compression intake pipe of a inches diameter. If now the nch gauge if the pressure within the cylin that in the straight part.



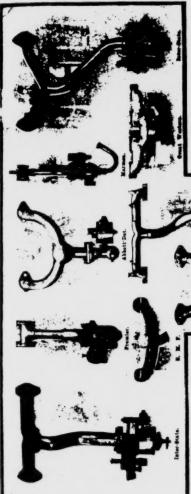




most significantly to the proper procedure in That this is really a very conservative esti-mant, probably because of the character of the surfaces of the cast passages, can be veri-fied by anyone by connecting in the two legs one particular form of manifold that was once very popular with makers of "sixes," the pres-sure loss through the manifold, in this way, the design of this part of the engine, and to with full throttle and maximum engine speed, was found to be 6.03 pounds. This last was, the losses and possible defective distribution of a manometer, one near the carbureter and of course, an exaggerated case; but it and the foregoing on bend losses serve to point the other with the cylinder port passage.

tive, as discussed above, and the qualitative, several cylinders of an engine. Quantitative distribution is unaffected by the presence or stated, is by far the more important of accomplishment, has to do with both the fuel and the air, and with the maintenance of the However tortuous the passages, or however great the loss through each, it is always possible to make them all alike in their effects is almost invariably done. But, anomalous as it may seem, those manifolds whose makers have been to the greatest pains to secure equal passage lengths are apt to be the worst of-fenders as regards distribution. This is because, in the case under consideration, there portions of the mixture as delivered to the absence of fuel in the mixture, since it deals simply with volumes of gas-air in this case. But qualitative distribution, which, as has been on the quantitative distribution. In fact, this are two kinds of distribution, the quantitawhich latter deals with the qualities or pro-While the above is very pertinent to manifold design, it by no means explains the chief cause of inequality of charge distribution

tively, in which the only consideration is an proportions as determined by the carbureter. ing, in our present day motor cars, a problem in carburetion, rather than in distribution pure and aimple. It has been seen that equality of distribution is easy of attainment, quantitaarrangement of piping that will convey equal quantities of a gas from a single supply Qualitative distribution is, properly speak-



bandied only as such. And it would and could be thus handled if the mixture were a tree one—a mixture of fuel vapor and six tree one—a mixture of fuel vapor and six where one is mixed with the other he action of the mixture, under all of the conditions involved in the supply system of an engine, is identical with that of a single gas. For this reason a true mixture of a sir and fuel would be distributed equally, in any sense of the term, by any poping system having equal effective passage lengths. That this much-to-be-desired result is not attained in articulatible to the fact that the "mixture" is not a mixture to the the fact that the "mixture" is not a mixture.

What he orders yes of the word

What the orders yes of carbureter nonleaving the order the feel is at once subjected to a reduction of pressure, and a relatively small portion of it is vaporized by this
agence—for the same reason and after the
same manner that water can be made to
reportize more readily at great altitudes than
it see level. Also, evaporation is at once
started through the absorption and utilization
of the heat in the air with which it comes
into contact. But no long as the fuel perists as a stream, the rate of vaporization is
so very low as to be but little short of engligible, since conditions are not then favorable
gible, since conditions are not then favorable

ing shall have nothing but a mixture of air and fact vapor to handle, is a practical impossibility. In practice the entrained fuel and that which is apread over the passage walls must also be manifolded, as well as that which is really vaporized and therefore behaves in really vaporized and therefore behaves in part of the fuel remaining as a liquid when bends and branches are to be negotiated that causes all of the trouble—and the more liquid there is the greater will be the trouble.

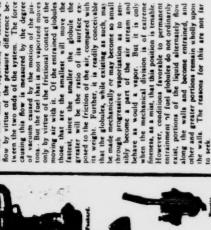
Within the mixture supply system of an engine, the air component, and also that part The force of vacuum caused by the motion of the pis-tons. But the fuel that is not vaporized moves moving air with it. Of the entrained globules of the fuel that is vaporized, is caused to flow by virtue of the pressure difference becausing this flow is measured by the degree only by virtue of the frictional contact of the greater will be the ratio of its surface exposed to the friction of the air, compared with its weight. Further, it is readily conceivable that the globules, while existing as such, may be made mechanically or may become so small those that are the smallest will move fastest, since the smaller the globule tween the two ends of the system.

through progressive vaporization as to sen

ates the fuel is ejected in a fine stream. Upon leaving the nozzle the fuel is at once sub-jected to a reduction of pressure, and a relasame manner that water can be made to vaporize more readily at great altitudes than of the heat in the air with which it comes into contact. But so long as the fuel per-tists as a stream, the rate of vaporization is tively small portion of it is vaporized by this agency-for the same reason and after the once so very low as to be but little short of neglifor a rapid transfer of heat from the air to With the ordinary types of carbureter nor through the absorption and utilization the fuel. Because of the high velocity of the air column into which the fuel is ejected from the stream becomes broken up, some of it finely enough for its entrainment. That part that does not become directly entrained, the nozzle, and the eddies and swirling of the by far the greater part, as a rule, becomes spread over the passage walls. In this final spreading and breaking up of the fuel atream lies the condition most favorable to vapori-sation in the average system; and if it could division of the fuel, nothing more could be he carried forward to the ultimate physical at sea level. Also, evaporation is at in the proper sense of the word. Pir.

But the time and temperatures involved are insufficient for this, and some of the fuel must therefore of necessity persists as a figure in passage through the manifold. Of course, the further the fuel is made to travel in this way, the more favorable become the vegorizing conditions, since the entrained globules continually become analier through exporation; thus presenting more surface to the air in proportion to their volumes, and since, through progressive surface exaporation the film of liquid that is spread over the surfaces continuously becomes thinner, thus again presenting an increasingly more favorable condition for heat transfer.

Even though these things are true, and are in fact the things that make the present type of supply system at all possible of use, this employment of surface carburction in the manifold requires for its sufficient accomplishment a really very considerable length of passage. But a sufficient length of straight passage, so that the real manifolding or branch.



fuel that

Even if it were possible initially to entrain the fuel as it left the notale of the carbureter, upon the wall in its passage past the throttle valve, unless the valve were fully opened. Butterfly throttles are now practically universal, but at all positions, except the fully open and those most nearly approaching it, they act as most effective deflectors and as by far the greater part of it would be thrown "clean" the air column of entrained liquid, depositing it upon one side of the pas-sage wall. Needless to say, the fuel continues in contact with the wall, though in its flow under the influence of air friction it tends to spread circumferentially over the surface of the passage. If the passage in which this first wall contact is had is long enough, is straight orced by the throttle into direct contact with and is vertical, the fuel will ultimately be evenly distributed over its surface. The fact that practically all of the fuel supplied is the wall of the passage above the carbureter, accounts for the great improvement in vaporiration that is had when this passage is long and is host jacketed. The walls then provide the most direct course of heat flow to the fuel for its vaporization. If the fuel were wholly entrained in its passage through this

part of the piping, the effect of the hot jacket would be negligible, since practically none of its heat could then be communicated to the

Coming now to a branching of the way in the intake manifold, the point in the system is made to approach the branching. We have to the deflecting action of the throttle valve, and also that the relative amount of it that is localized, so to speak, upon one side of the passage depends, inversely, upon the length of the passage before the branching is entribution can or does start. Whether it does or does not depends upon conditions in the countered, and upon the amount of closure of a reached where imperfect qualitative dispassage leading to the meeting of the branches. As stated before, and repeated here for emphasis, there will be no inequality of distribution if the content of the main passage is comprised of a mixture of air and fuel vapor pends upon the manner in which the liquid contact with the wall in the main passage, due But if liquid is present, the equality or in equality of the distribution at this point de the throttle.

fuel remaining in the passage at the branching will be almost wholly aspirated into the left branch when the main flow of air is in that direction; while, when the flow is in the opposite direction, to the right, but very little of it will be taken into the latter branch The obvious thing for the fuel to do is to adhere almost wholly to the wall, in a passage of so little length. If it is a T branching with the axis of the throttle spindle perpendicular to the plane of the T, and the throttle disc is so inclined that the fuel is thrown upon the left of it will be taken into the latter branch This is because of the tendency of the liquid to wall of the vertical passage, the unvaporized adhere to the wall when once in contact with it, and because of the tendency of the entrained globules to persist in their rectilinear motion when the turns are at all sharp. The result in such a case is that the cylinder or cylinders supplied by the left branch will normally work on richer mixture than will those to the right. If the throttle is set so tions will only be reversed, and the cylinders that the disc inclines the other way, condiat the right will then receive the richer mix-

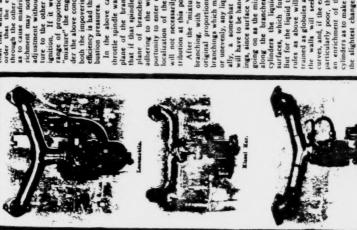
than that when will give the best results, in order that the enrichment of the misture through the other branch may not be so great as to cause mistings, and, vice versa, the enrichment may not be reduced by estituted adjustment without so impoverishing the mix-ture to the other side as to cause failure of ignition. If it were not that a considerable range of proportions can be employed in the "mixture" the engine would cease to act un-der the above conditions. Needless to say, on both the impoverished and over-rich sides, inefficiency is had through reduction of the com-

In the above case it was taken that the throttle spindle was set perpendicularly to the plane of the branches. It is quite obvious that if that spindle is set with its axis in the plane of branches, that part of the fuel adhering to the wall will have the same opportunity to enter either of the branches, and will not necessarily adversely affect the disocalization of the chief mass of the liquid tribution at this point of first branching.

After the "mixture" has negotiated the first along the branches. As it approaches the cylinders the liquid will encounter warmer surfaces, which further aid in vaporization. branching, with or without alterations in its original proportions, there still remain other branchings which may further subdivide evenly or unevenly, any liquid reaching them. Naturwill have to be handled in the further branch. going on as the mixture components progress rules as above will apply. Whatever is enparticularly poor, this may result in so great an enrichment of the mixture to one of the ally, a somewhat lesser amount of liquid ings, since surface vaporization will have been But for the liquid that does remain, the same trained as globules and whatever remains upon the walls will seek the outer radii of all curves, and, if the earlier distribution has been cylinders as to make it unduly sensitive to even

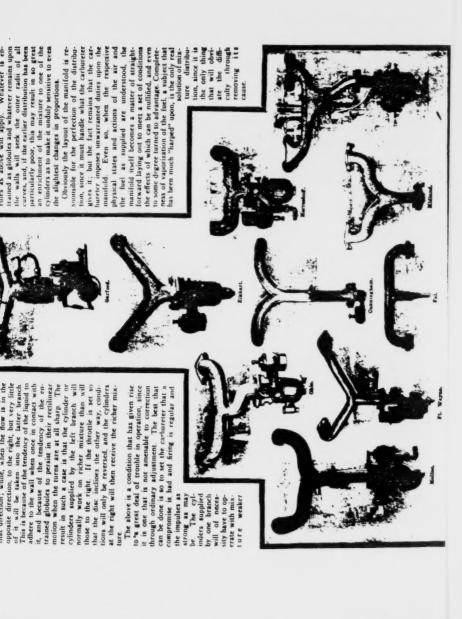
Obviously the layout of the manifold is responsible for the perfection of the distribugives it; but the fact remains that the carmanifold. Even so, when the respective tion, since it must handle what the carbureter bureter imposes unwarranted duties upon the physical states and actions of the air and the slightest changes in proportions.

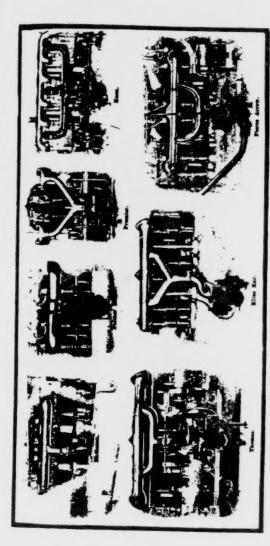
the fuel as supplied are understood,





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On Manifolds and Distribution.

Some Further Considerations of the Design of Intake Systems as They Affect the Equality of Distribution of the "Mixture" to the Engine Cylinders.

By P. S. Tice.

N the article under the above title, which appeared in the April issue of MoTOR, was embodice a discussion of the general characteristics of manifolds wiewed as distributes of "mixture" and oil the conditions that are imposed upon them by the carbureter. The cheeff significant points brought out were that the manifold is called upon to act as a "apporter and to maintain the proportions in the mixture under conditions that are decided, unfavorable to the attainment of such a

use any unavorable to the attainment of such a But very little analysis of the situation is necessary to indicate the magnitude of the



comes when it is attempted to combine them all in a single 'pipe." The effects upon the distribution of the early and presumably necessary bear and presumably necessary bear in the pipe can be concreted by the use of other bends, but these additional bends may disturb the quantitative action, and they most certainly impose additional aspiration losses. The passages must combine freedom and the quality of maintaining the mixture proportions at the same value in each branch. In a general way, dependent upon present carburation methods, this means that the pipe must be as straight as possible and at the

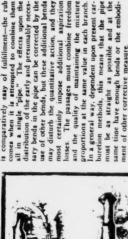
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appeared in the April issue of MoToR, was embodied a discussion of the general characteristics of manifolds viewed as distributors of "mixture," and of the conditions The chiefly significant points brought out were that the manifold is called upon to act as a vaporizer and to maintain the proportions in edly unfavorable to the attainment of such a that are imposed upon them by the carbureter. the mixture under conditions that are decid-

But very little analysis of the situation is difficult. Throttle valves and bends both serve other bends, there is an increased resistance to the passage of the "mixture" through the necessary to indicate the magnitude of the conditions that make equality of distribution so to rearrange the mixture ingredients that extreme care must be employed in laying out the manifold if the separation of the liquid from the gas is not to give rise to defective tion of bends in the piping can be made to give sensibly equal distribution. But where addi-tional bends are used to offset the effects of pipe, over that which would of necessity he exdistribution is sought through the insertion distribution. Naturally, a judicious combinaperienced in a system requiring no such correction. And where correction of qualitative sion of the losses due to bends, the reader is into the system of bends or other deflectors intended to modify the flow of the liquid mixture component, the effective passage lengths to the several cylinders cannot but be altered among themselves, sometimes to a very considerable and serious extent. For a discusreferred to page 11 of the April issue of MoToR

The ideal intake manifold is easily speci-It is one in which equality of distribution is had, both qualitatively and quantitatively, and in which no unnecessary resistance is offered to the flow of the mixture. There through the pipe, but the ease with which this loss can be augmented to almost prohibitive proportions, as indicated in the former article, points to the necessity of keeping it down to some loss in pressure must, of course, be

Any one or other of the above specifications



Because of the generally more far reaching and adverse effects of imperfect qualitative distribution, as compared with failure in other directions, it is usual to sacrifice as much as may be necessary of freedom and equality of effective passage length to the attainment of the relatively much more desirable condition. This is a logical procedure, since it is a compromise between conditions that are not reconciled to each other, with a view to securing the best mean result.

The extent of such a compromise between the conditions, and the loss in freedom that equality of qualitative distribution, is, as a rule, much greater in the supply system of a Likewise, the necessary loss in freedom of the passages becomes still greater as the number six than in the case of a four-cylinder engine. of cylinders is further increased. This is because of the increased number of ultimate fore greater number of changes in direction of flow that must be made by the "mixture" bemust be borne for the sake of a working branchings to the cylinder ports, and the therefore it reaches the final branchings.

If what was formerly said about the effect ever fuel remained in the pipe as a liquid is ing to the outer radius of all curves of whatremembered, the reason for this increasing be quite apparent. If the piping could be arranged so that each time a branching was encountered the curve in the pipe approaching of a deflector, as the throttle, and the throwdifficulty with increasing numbers of cylindes the branching lay with its axis in a plane per-



pesulcular to the axes of the branches or bisecting the angle formed by them, the liquid
countent of the mixture would be divided
equally between them, and the quality would
not then differ in them. But, obviously, from
space or other consideration, this method of arpages or other consideration, this method of artanging the piping is a practical impossibility
throughout the whole system, even though it
may be accomplished throughout the earlier

branchings.

We have seen that the requirements for equal distribution at the branchings do not ordinarily fit in with the construction there possible, because of the fact that the liquid will seek the outer walls of the curved parts. Let us begin at the ends of the branches, the cylinder port ends, and reconstruct the pipe back to the carbureter.

reed ports of a twin cylinder casting, it has been shown that the intake passage must be the branches. The only way practicable in which such a result can be accomplished where ing from the end be made to deliver to the two Whether the cylinders are cast individually for the attachment of the intake pipe will lead to a symmetrically disposed passage or pas-sages to the actual valve ports. There being no branching at this point with individuallycast cylinders, no trouble will be experienced here with them. But, in the case of the siamarranged with its curvature lying in a plane which bisects the angle between the axes of a pipe end is used for communication with the cylinder port is to lead the pipe over the cylinder., as is sometimes done. But this requires makes necessary the use of more bends than would be the case with the ordinary "one cylinders with absolute certainty of qualitative or in pairs with the ports siamesed, each port an additional pipe length and almost invariably But the fact remains that in this way only can a passage discharg side" intake system.

equality.
Another solution eeems to lie in the use of opposed brancher feading to the same port, opposed brancher feading to the same port, the outer radio of the engine port, the outer radio of the capine more of the liquid to the curves also oppose each other, and it is manifestly impossible for more of the liquid to be swept into one valve passage than into the other, provided, of course, that each of the opposed branches carrier the same amount of liquid. In this way can the distribution beyond the ends of the

to apprinte a given quality of mixture. If the carburater is connected in at one ead of this common horizontal pice, it is a foregone concuration that the liquid content of the mixture will return to take the turns into the intermediate cylinders, but will, by virtue of its momentum and its persistence in rectilinear momentum and instruct, and so on to the end cylinder farthest from the carbureter which will appirate the richest mixture of all, since there will be no other outlet for the unvaportized liquid that has swept past the other ports. Furthermore, when the carbureter communi-

Turtle qual that has weep past in eother portacates with the centure of this common passage, the same action obtains, thought in a lesser degree, the two end cylinders tending to receive the richer charges. Then again, with this symmetrical connection of the pipe from the carbureter, the two branches leading from it to the cylinder ports may not be served equally because of defective distribution at the point of innetion, as discussed in the former article, which condition may be so aggravated by other defects as to make it as bud as that had when

this type of "pipe" is most interesting, and a fore. In this latter system the mixture from the carbureter is led into the two ends of the common passage, the complete pipe forming a so-called "loop" or "yoke." The action of study of it serves to show by what simple means an ordinarily difficult situation can sometimes be obviated. In its usual form it comprises two horizontal passages of equal lengths, the ends of which are connected by kuryed parts of as great a radius as may be desired. One of these horizontal passages is provided with right angle outlets to the sevat its center with the passage leading from the bureter and cylinder ports, there are but four curves to be negotiated by the mixture, and two of these can be made of such a radius that the loss due to them is but little more the common passage. There is another method of using a single common horizontal connection between the cylinder ports that is coming rapidly to the eral cylinder ports, and the other is connected carbureter is connected directly to one end carbureter. In its entire makeup, between car-

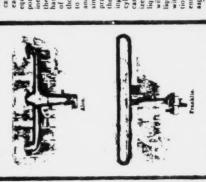
than that in an equal length of straight pipe. The effect of the throttle upon the distribubureter with one of the horizontal members can be neutralized, as before shown, so that each side of the branching will be served and left members of the horizontal passages, tion at the junction of the pipe from the carthe interior of the pipe is smooth and that it has been accurately made. Let us suppose one though it be an end one, the mixture will flow to it from each side and through both right since the passage lengths, right and left, are practically equal in the matter of resistance to the flow of gas, which latter is the determining factor. With the mixture coming to the cylinder port in two opposed columns, each carrying the same amount of liquid unvaportion of the liquid past the port for the undue enrichment of the mixture subsequently to be equally. From this point on to the cylinder ports themselves there is but little chance for of the cylinders to aspirate its charge. Even ized, it is evident that the tendency for the liquid to whip out of the column on one side will be counteracted by a like tendency in the liquid carried by the column on the other side, with the result that there will be no continuainequality to come into the action, providing

appirated by some other cylinder farther along.

These then are the conditional that month be has been accurately made. Let us suppose one

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an additional pipe length and almost invariably



ries the same amount of liquid. In this way can the distribution beyond the ends of the pipe itself and within the cylinder ports be makes necessary the use of more bends than would be the case with the ordinary, "one side" intake system. But the fact remains ing from the end be made to deliver to the two cylinders with absolute certainty of qualitative Another solution seems to lie in the use of opposed branches leading to the same port, since it is then permitted to use a horizontal system all on the same side of the engine. Where two opposed branches lead to the same port, the outer radii of the curves also oppose each other, and it is manifestly impossible for more of the liquid to be swept into one valve passage than into the other, provided, of course, that each of the opposed branches carthat in this way only can a passage dischargequality.

gine a single horizontal pipe connecting all of ing equal the qualitative distribution between the several cylinders or cylinder ports. From the very nature of the construction of an enthe cylinder ports is the most natural and most simple, and is also capable of being made most free. With such a pipe connecting all of the cylinders, the problem is how to supply the mixture to it so that each cylinder will be able The next point includes provision for mak made equal.

carrying the same amount of liquid unvapor-ized, it is evident that the tendency for the liquid to whip out of the column on one side will be counteracted by a like tendency in the practically equal in the matter of resistance to the flow of gas, which latter is the determin-ing factor. With the mixture coming to the cylinder port in two opposed columns, each tion of the liquid past the port for the undue enrichment of the mixture subsequently to be aspirated by some other cylinder farther along.

These then are the conditions that must be directly traceable to the imperfect manner in which our carbureters vaporize and mix the fuel with the air. If one has distribution diffithing first to be tried is some means of accelit does not matter what sort of a manifold is liquid carried by the column on the other side, with the result that there will be no continuaconsidered in the handling of the intake gas; and they are all, in so far as they are adverse, erating the vaporization of the fuel and improving the quality of the mixture. If the vaporization can be made sufficiently complete,

to it from each side and through both right and left members of the horizontal passages, since the passage lengths, right and left, are

though it be an end one, the mixture will flow









DEC 9 1912

IN THE

Supreme Court of the United States

OCTOBER TERM, 1942

No. 530

THE SWAN CARBURETOR COMPANY,

Petitioner.

US.

CHRYSLER CORPORATION,

Respondent.

RESPONDENT'S BRIEF OPPOSING PETITION FOR WRIT OF CERTIORARI

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December, 1942.



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No. 530

THE SWAN CARBURETOR COMPANY,

Petitioner,

118.

Chrysler Corporation,

Respondent.

RESPONDENT'S BRIEF OPPOSING PETITION FOR WRIT OF CERTIORARI.

This is a suit, in the usual form, for the alleged infringement of two patents relating to intake manifolds for internal combustion engines.

Petitioner's complaint was dismissed by the District Court on the ground of non-infringement. 34 F. Supp. 766; V, 1822-1832. The Circuit Court of Appeals for the Sixth Circuit affirmed, holding all of the claims in suit either invalid or not infringed. 130 F. (2d) 391; V, 1851-1859.

The decision sought to be reviewed is manifestly right, and is not in conflict with any decision on the patents in any other Circuit. It involves nothing more than the reversal, by the Circuit Court of Appeals of the Sixth Circuit, on a more complete record, of part of an earlier decision of a District Court in the same Circuit. The controlling principles of law are all well settled. The single patent to which the petition is directed is no longer in force, having expired in April, 1942.

There is no reason for the granting of a writ of certiorari to review this ordinary patent infringement suit, in which no question of general or public interest or importance is involved.

The Nature of Swan's Alleged Invention.

There were two patents in suit, Swan patents 1,636,721, application filed in 1921, and 1,536,044, application filed in 1924 as an alleged division of the original application. Although the decision below was against petitioner on both patents, the petition is confined to the "divisional" patent '044.

The intake manifold of an internal combustion engine, to which the patents in suit relate, is the passageway or piping through which the combustible mixture of gasoline and air passes on its way from the carburetor (where the mixture is formed) to the cylinders (where it is exploded to furnish the driving force). All of the manifolds involved in this case are of the simple and conventional "T" type, in which the mixture is led from the carburetor through a vertical riser to a longitudinal header, from which three transverse branches (one from each end of the header and one from its middle) lead to the engine cylinders. In sixcylinder engines, such as are involved in this case, each branch of the manifold serves two cylinders. A manifold has no moving parts, but serves simply as a passageway or conduit through which the mixture is drawn from the carburetor to the cylinders by the suction of the pistons. The manifold influences the distribution of the mixture among the several cylinders solely by reason of its shape or configuration.

The earliest examples of these conventional T type manifolds disclosed in the present record are manifolds used on the Fiat automobile in 1907 and on the Matheson "Silent Six" automobile, 1910-1913. In both of these prior art T type manifolds the passageways were of round

cross-section, and at least some of the turns within the manifolds were rounded bends.

In the early days of motoring, in which these T type Matheson and Fiat manifolds were used, the gasoline sold for automobile use was highly volatile, and at normal temperatures of operation much of the gasoline in the mixture passing through the manifold was in vapor, rather than in liquid, form. These early manifolds functioned very well to distribute such dry, or relatively dry, mixtures evenly among the several cylinders.

Later on, at the time of the first world war, the heavy demands for gasoline necessitated the inclusion in commercial gasoline of some of the less volatile constituents of petroleum, so that at the same normal temperatures of operation, much of the gasoline in the mixture would be in liquid form instead of vapor as before.

Two solutions were proposed for the resulting "wet mixture problem", as it is called by the petitioner. The first of these (the solution which was generally adopted and was adopted by respondent) was to apply heat, from the exhaust or elsewhere, to vaporize the gasoline to a degree comparable to that occurring without heat with the earlier more volatile gasoline. The resulting dry, or relatively dry, mixture could naturally be distributed by the old forms of manifold in exactly the same way as the earlier mixtures having a corresponding degree of vaporization.

The other proposed solution of the "wet mixture problem", the one proposed by Swan, (which respondent did not adopt) was not to rely on heat, but to make changes in the shape of the manifold to enable it to distribute better the unvaporized portion of the fuel.

The manifold proposed by Swan to distribute "wet mixtures", without reliance on heat for vaporization of the liquid portion of the fuel, had a riser, header and branches arranged in exactly the same way as in the earlier Matheson and Fiat manifolds. The only differences were that in Swan's manifold the passageways were square, instead of

round, and that at all points within the manifold where the mixture was required to change direction, Swan provided sharp, square corners instead of round ones. A plan view of the Swan manifold is shown at the top of the chart

facing page 8, infra.

Swan filed a patent application disclosing this unconventially shaped square manifold in 1921. In this patent application it was asserted that great benefits were derived from the use of the flat floor and the flat roof (which resulted from the use of passageways of square cross-section) and from the use of sharp, square corners at the turns. The flat floor was supposed to permit the liquid fuel to spread out and be more readily entrained by the rush of air through the manifold than would the narrow stream of liquid lying in the bottom of a passageway of conventional round cross-section. And in passing around the square corners of the Swan manifold the liquid portions of the mixture were supposed to splatter and rebound, thus remixing with the air.¹

Petitioner demonstrated this new square manifold to the head of the Buick Division of General Motors and the manifold was adopted and used on the Buick cars of 1924, under license from petitioner. After a short period of use, however, General Motors found that the Swan manifold was no more effective than a manifold of the conventional round cross-section, when used with a heater to vaporize a sufficient portion of the liquid fuel. General Motors therefore substituted a conventional round cross-section manifold for the Swan square manifold, and declined to pay any royalties thereon. These round General Motors manifolds were put on the market about the middle of 1924, and at about the same time a similar manifold was adopted by the Nash Company, whose engine was similar to that of Buick.

¹ File Wrapper, Defendant's Exhibit 140, Reeke-Nash record, Vol. IV, pp. 2090-2097.

Up to the time of the adoption of these manifolds of conventional round cross-section by Buick and by Nash, no claim had been made by Swan that he was the inventor of such manifolds. On the contrary, such round cross-section manifolds represented Swan's point of departure from the prior art and were contrasted with Swan's manifold, both in Swan's arguments to the Patent Office and in a technical paper which he wrote, in conjunction with two of petitioner's other engineers, for publication in the Journal of the Society of Automotive Engineers in 1923. Up to this time Swan's alleged invention consisted only in making square a manifold which before had been made round, and in the use of sharp square corners at the turns.

To obtain a basis for claiming tribute on such round manifolds as those adopted by Nash and General Motors, petitioner, in November, 1924, several months after the Nash and General Motors manifolds had been placed upon the market, filed a second patent application as an alleged "division" of the original application of 1921. In this 1924 "divisional" application Swan first advanced claims to the invention of a "method of distribution" of a mixture by a manifold, describing the "method" in terms so broad and ambiguous as to be capable of being construed in such a way as to cover the normal operation of any satisfactory T type manifold, including the conventional T type manifolds used by Matheson and Fiat, ten years or more before Swan.

Swan also asserted claims to fragmentary portions of the manifold structure, describing them functionally, in terms of the desired result, so as to cover, if possible, any structure producing results which were commercially acceptable.

¹ Ibid., pp. 2109-2112, 2116, 2119-2124; Chrysler record, Vol. V, pp. 1665, 1668-1670, 1674, 1678. See also the succinct statement by Swan himself, in the discussion following the presentation of this paper, reproduced as an Appendix to this brief, infra, p. 19.

The reasons of the Patent Office for granting these ambiguous and functional claims do not appear, for the prosecution of the divisional application was conducted mainly by ex parte conferences with the examiner and the claims were allowed after a number of amendments without a single intervening action by the examiner (infra, p. 16).

In any event, patent 1,536,044 was granted in 1925, upon this "divisional" application, containing a number of ambiguous and indefinite "method" claims, and some apparatus claims, some of which were objectionably func-

tional in character.

Later on, in 1927, patent 1,636,721 was granted upon Swan's original application, containing claims defining the shape of the Swan manifold as originally presented. Two claims of this original Swan patent, '721, were in suit in the present case and were properly held by both the District Court and by the Circuit Court of Appeals to be not infringed by any of respondent's manifolds, all of which, like the prior art Matheson and Fiat manifolds, have passageways of round cross-section, and have rounded bends instead of square ones. Although this patent, '721, which was granted on the original application, is still in force, and will remain in force until 1944, the petition for certiorari is limited to the later applied for "divisional" patent, '044, which expired some months ago.

The Decision in the Case at Bar Is Manifestly Right.

Three types of manifold used by respondent are involved in the present case (designated in the case as the Dodge, Dodge-Plymouth and DeSoto manifolds). Each of these manifolds is of round cross-section, like the prior art, instead of square like Swan. Also, each of respondent's manifolds has rounded bends instead of square corners at the turns from the header to the branches. These bends are even more rounded (i. e., further removed from square)

than the rounded bends of the prior art manifolds, with which Swan contrasted his square corners.

In addition, the passageways in respondent's Dodge-Plymouth and DeSoto manifolds (the most important ones in point of numbers produced and the only ones that were tested in this case) run uphill and down again from the central junction to the ends of the branches, this being in marked contrast to the flatness and levelness which was an essential of Swan's manifold. (See the illustration of this Dodge-Plymouth manifold at the bottom of the chart on the following page.)

Because of these important differences between respondent's manifolds and the Swan manifold, the patent claims defining the Swan manifold very naturally do not include respondent's manifolds. Respondent's manifolds were properly held by the Circuit Court of Appeals not to infringe because of their lack of such essential Swan features as the sharp corners at the inside of the turns, which had been present in the "first group" Nash manifolds and had accounted for the holding that those manifolds infringed in the earlier decision of the same Court in Swan v. Reeke-Nash. (See the illustration of the Reeke-Nash manifold just below the Swan manifold on the chart on the following page.)

The manifolds of respondent in this case could not have been held to be infringements, regardless of the language of the patent claims, because, with respect to every feature of construction, respondent's manifolds are a departure from the prior art in the opposite direction from the direction of Swan's departure from the prior art. Because of this fact, petitioner's patent claims could not possibly exclude the prior art, as they must in order to be valid, and at the same time include respondent's manifolds, which are more remote from Swan than is the prior art.

The impossibility of Swan's claims covering respondent's manifolds is graphically shown by the chart on the following page, on which the Swan manifold is shown at the top, the prior art Matheson and Fiat manifolds in the middle,

and respondent's Dodge-Plymouth manifold at the bottom. The line A-A on this chart, lying between Swan and the prior art, represents the extreme limit to which the field covered by Swan's claims can be extended without including the prior art and thereby making the claims invalid. Obviously, if this line were moved down on the chart far enough to include respondent's manifolds at the bottom of the chart within the field covered by Swan's claims, the claims would inevitably include the intervening prior art manifolds, and would therefore be invalid.

The Prior Litigation Involving the Swan Patents.

The litigation on the Swan patents is by no means as confused as the petition indicates. There is definitely no conflict between the decision sought to be reviewed and any decision on these patents in any other Circuit. In fact, petitioner has so handled the litigation that there could be no conflict. There has been only one other suit in which the validity of the patents has been in issue—and that suit was in the Sixth Circuit.

Swan v. General Motors (D. C. N. D. Ohio), 42 F. (2d) 452; affirmed (C. C. A. 6), 44 F. (2d) 24:

The first suit in which either of the Swan patents was involved was not an infringement suit but was a suit against General Motors for royalties due, under its license agreement, on the round cross-section manifolds which it had substituted for the original square Swan manifolds. After discussing the unusual situation presented by this license agreement, the Court held that, under the agreement, royalties must be paid on these manifolds in spite of the differences between them and the Swan manifold. The key to the decision is the District Court's statement (p. 454) that

"In view . . . of defendant's right to cancel [the license agreement], and its action in expressly refraining from so doing, it would seem that the

COMPARISON OF MANIFOLDS

SWAN

FIG. 8 OF ORIGINAL APPLICATION



Note the square cross-section and the sharp, square corners at the turns.

REEKE-NASH

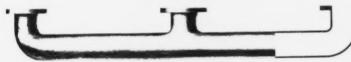


Held to infringe because of the sharp square corners at the inside of the turns.

This line A-A represents the maximum possible extent of the field of Swan's monopoly. If this field were extended any further toward respondent's manifolds at the bottom of the chart. Swan's field would include the intervening prior art manifolds, and the claims thereby invalidated.

PRIOR ART

MATHESON



The sharpest of the three rounded bends illustrated on this chart.

FIAT



More rounded than the bend above.

RESPONDENT'S

DODGE - PLYMOUTH



(FRONT VIEW)

Still more rounded—i.e., further removed from Swan's square corners than the prior art manifolds above.



patent claims ought not to be scrutinized with extreme care in order to find a way to save defendant from complying with its promise. . . . "

Also, these "first group" General Motors manifolds did have square corners on the inside of the turns within the manifold, and therefore resembled the Swan manifold rather than the prior art, with respect to this detail of construction. These first group General Motors manifolds were very similar to the Reeke-Nash manifolds shown on the chart on the preceding page.

Swan v. Reeke-Nash (C. C. A. 6), 88 F. (2d) 876, 885:

The second suit on these patents was an infringement suit against Reeke-Nash, the Cleveland dealer in Nash cars. Both patents were charged to be infringed by the "first group" Nash manifolds, manifolds of round crosssection which resembled closely the first group manifolds on which General Motors had been required to pay royalty. A special master and the District Court sustained all of the patent claims relied upon by plaintiff. The Circuit Court of Appeals refused to affirm the decision with respect to the "method" claims and some of the apparatus claims involved in the present suit, and ordered the complaint dismissed without prejudice so far as these claims were concerned. With respect to other claims the Circuit Court of Appeals sustained the decision below, finding that four of the claims in suit, two from each patent, were infringed by the Nash first group manifolds.

The key to this decision is the fact that the manifolds in issue had sharp, square corners at the inside of all turns within the manifold, like the first group General Motors manifolds on which the payment of royalties had already been required. Such a sharp corner is indicated by the red arrow in the illustration of the Reeke-Nash manifold on the

chart on the preceding page.

Swan v. General Motors (second case) (C. C. A. 6), 88 F. (2d) 876:

This was another suit for royalties due under the license agreement and involved some "second group" General Motors manifolds which differed only slightly from the adjudicated first group manifolds, and gave identical results. The case was tried before a jury, whose verdict was that royalties were due under the license agreement, as in the case of the first group manifolds.

On defendant's appeal, which was heard and decided by the Circuit Court of Appeals simultaneously with the Reeke-Nash case, supra, the issues were whether the license agreement might be reformed and whether the District Court's instructions to the jury had been correct. The holding was that the agreement would not be reformed and that the instructions to the jury had been proper.

All of the decisions referred to above were either rendered, or affirmed, by the same Circuit Court of Appeals which rendered the decision now sought to be reviewed. The joint opinion in the *Reeke-Nash* case and the second *General Motors* case was rendered by the same judges (Circuit Judges Hicks, Simons and Allen) as those who rendered the decision in the case at bar.

Swan v. General Motors (third case) (D. C. N. D. Ohio), 43 F. Supp. 499:

This latest General Motors case, like its predecessors, was a suit at law for royalties under the same agreement as was involved in the earlier cases. The holding was that royalties were due, under the agreement, on various additional manifolds which had been adopted by General Motors. The decision, by a District Court of the same (Sixth) Circuit, was not appealed and General Motors has finally settled its differences with petitioner (Petition, p. 19).

We come now to the decision in the only suit on these patents that has been brought outside the Sixth Circuit, that of the Circuit Court of Appeals for the Fourth Circuit in the case of *Swan* v. *Nash*.

Swan v. Nash (C. C. A. 4), 105 F. (2d) 305:

This suit was brought against the Nash Company itself for two separate but related purposes-first, to obtain an accounting of profits and damages on account of the first group manifolds, which had been held to infringe in plaintiff's earlier suit against the Nash dealer, Reeke-Nash; and second, to adjudicate new charges of infringement against some "second group" manifolds with which the Nash Company had replaced the infringing first group manifolds. Since the Nash Company had defended the Reeke-Nash case, it was admittedly bound by the result and no question was presented in the Fourth Circuit case as to validity or as to infringement by the first group manifolds. The sole issue presented was whether the new second group manifolds infringed the single claim that was charged to be infringed (claim 20 of the "divisional" patent, '044).

The charge of infringement against the second group Nash manifolds was based largely on the fact that they produced exactly the same results, in terms of engine performance, as the Swan manifold and the previously adjudicated first group manifold. The defense was that the second group manifolds could not infringe because they were in effect the prior art, being a reproduction of the prior art Matheson manifold in the smaller size required to fit the smaller engine used by Nash. The Circuit Court of Appeals sustained this defense and held that the second group Nash manifolds did not infringe the single claim in suit.

The Decision Sought to be Reviewed Is Not in Conflict with Any Decision on These Patents in Any Other Circuit.

As stated above, the only suit on these patents outside the Sixth Circuit is the suit of *Swan* v. *Nash*, in which it was held by the Circuit Court of Appeals of the Fourth Circuit that the second group (reduced Matheson) Nash manifolds did not infringe claim 20 of Swan patent '044.

The decision of the Circuit Court of Appeals for the

Sixth Circuit in the present case is:

(1) That claims 5 and 7 of Swan patent '721 and claims 13 and 23 of Swan patent '044 are not infringed by the manifolds used on any of respondent's cars (Dodge, Plymouth, Chrysler and DeSoto), and

(2) That claims 4, 5, 8, 9, 10 and 22 of Swan patent '044 are invalid.

Thus the decision in the case at bar is not in conflict in any way with the decision of the Circuit Court of Appeals of the Fourth Circuit. On the contrary, it is entirely consistent. Both Courts held that the manifolds involved in their respective cases did not infringe the claim or claims

that were charged to be infringed.

As a matter of fact, a conflict of decision between the case at bar and the Fourth Circuit case of Swan v. Nash was rendered impossible by petitioner's withdrawal from suit, at the opening of the trial of the case at bar, of claim 20 of patent '044, which was the only claim involved in the case of Swan v. Nash. This claim was originally charged to be infringed in the present case (I, 25). By the strategic withdrawal of claim 20 at the beginning of the trial of the case at bar (I, 140), petitioner was assured against a conflict of decision and consequent review by this Court, if it should succeed in obtaining a holding in the present case that respondent's manifolds were infringements of any of the claims remaining in suit.

The harmony between the decision in the case at bar and the Fourth Circuit decision extends to the question of validity, as well as the question of infringement. Though validity was not in issue in the Fourth Circuit case (because the Nash Company had defended the Reeke-Nash case and was bound by the result), and the Court therefore rendered no decision on validity, the Court did observe that doubt had been cast upon the validity of the patent by certain tests and testimony, there introduced for the first time, which showed that under the conditions of operation used in the Nash car (in which exhaust heat was used to vaporize a large part of the liquid fuel), a manifold of the prior art Matheson configuration produced almost identically the same results as a Swan manifold, both on the Nash and the original Matheson engines. 105 F. (2d) 305, 310. In the case at bar, which was decided after the decision in the Fourth Circuit case, and in which additional tests were presented showing that the results achieved by the prior art Matheson and Fiat manifolds were virtually identical with those achieved by the Swan manifold, both on the original Matheson and Fiat engines and on the Chrysler engine, the Circuit Court of Appeals of the Sixth Circuit proceeded to hold invalid several of the claims which it had not previously adjudicated, namely, the ambiguous "method" claims 4, 5, 8, 9 and 10 and the functional apparatus claim 22 of the "divisional" patent, '044.

Petitioner's Reasons for the Granting of a Writ of Certiorari Are Not Well Founded.

(1) Alleged Conflict of Decision. We have shown above that the decision in the case at bar is not in conflict with any decision on these patents in any other Circuit.

In its earlier suit against Reeke-Nash, petitioner succeeded in persuading the Circuit Court of Appeals for the Sixth Circuit that the prior art Matheson and Fiat manifolds were "prior efforts and failures". In the case at

bar the same Court was convinced by tests, not presented in the earlier case, that the prior art Matheson and Fiat manifolds were satisfactory manifolds, producing in fact results substantially identical with those produced by respondent's manifolds and by the Swan manifold, when operated with a corresponding degree of vaporization by heat. This improved opinion of the prior art by the same Court, in the light of these further proofs, creates no conflict of decision entitling plaintiff to review by this Court.

Petitioner contends that the Court below erred "in permitting modifications of the prior art to qualify or limit petitioner's patent claims", citing alleged conflicting cases in the Second and Eighth Circuits. These cases are not in point for the prior art was not modified in the case at bar. As the Circuit Court of Appeals said in its opinion, respondent's manifolds were given road tests in comparison with manifolds constructed "in exact conformity with the prior art, namely, Matheson and Fiat, all equipped with exhaust heaters similar to those used in the accused devices", 130 F. (2d) 391, 392-393; V. 1853-1854. And further tests were made showing substantially the same results upon the original Matheson and Fiat engines, "using the original manifolds in comparison with manifolds of Swan's preferred form, appellee's [respondent's] heating means being applied in every case" (id.). The purpose of the heaters in these tests was the same as that of the heaters used on respondent's manifolds-to vaporize enough of the liquid portion of the fuel to obtain a relatively dry mixture, corresponding to the mixture distributed by these prior art manifolds when operating on the more volatile gasoline with which they were originally used (supra, p. 3). See also the District Court's Findings regarding these tests and the test manifolds (V, 1828-1831, paragraphs 15-19).

¹ Vaporization by heat was no part of Swan's alleged invention; on the contrary, Swan warned against reliance on heat for vaporization as it reduces the volumetric efficiency or ultimate power produced ('721 patent, IV, 1222, lines 28-53; '044 patent, IV, 1208, lines 36-53).

Petitioner's complaint (Petition, p. 26) that the District Judge did not attend certain tests conducted by respondent is absurd. The tests were conducted *inter partes* and the numerical results are in the record. The reason why the District Judge was absent from the tests was that *petitioner* objected to his presence (II, 471-2).

(2) Alleged Estoppel to Deny Validity. Petitioner asserts that the Circuit Court of Appeals erred in not holding respondent estopped to deny the validity of the claims which it held invalid, by reason of what petitioner calls a "final decree against a privy of respondent", referring to the decree of the District Court in the Reeke-Nash case holding these claims valid. The shortest answer to this contention is that the decree referred to was a mere interlocutory decree, not a final decree on which alone an estoppel can be founded. In its decision in the case referred to (Reeke-Nash), on appeal from this allegedly "final" decree, the Circuit Court of Appeals (Sixth Circuit) expressly directed that the bill of complaint be dismissed without prejudice as to all of the claims now under discussion. 88 F. (2d) 888, last sentence. And a real final decree, dismissing the complaint without prejudice with respect to these claims, was then entered upon the mandate of the Circuit Court of Appeals, specifically superseding the interlocutory decree which petitioner mis-describes as "final" (I, 40, 42, paragraph 9).

Another answer to this contention is that respondent was not in privity with *Reeke-Nash*, as contended by petitioner. Petitioner's contention is based on the fact that respondent is a member of the Automobile Manufacturers Association, which participated in the defense of the *Reeke-Nash* case. Respondent contended in both Courts below that it was not in privity with *Reeke-Nash* and was not estopped to contest the validity of the claims held valid by the Circuit Court of Appeals in the *Reeke-Nash* case. The District Court sustained petitioner's contention on this issue and

the Circuit Court of Appeals did not discuss the matter, the issue being rendered moot by the Court's decision that the claims were not infringed.

If the petition for certiorari should be granted, respondent would ask this Court to reverse the decision on this point and to hold respondent free to show the invalidity of all of the claims in suit, as well as non-infringement.

(3) The "Method" Claims. We have already shown that the present decision that these claims are invalid is not in conflict with any decision on the patents in any other Circuit, and involves nothing more than the reversal by the Circuit Court of Appeals of the Sixth Circuit, on a more complete record, of an earlier decision by a District Court in its own Circuit.

Petitioner's statement that the form of the "method" claims was suggested by the Patent Office (Petition, p. 7) is not supported by petitioner's citation to the file wrapper. The file wrapper shows that the prosecution of the applieation resulting in the "divisional" patent '044, containing the method claims, was conducted in a most extraordinary manner. During the prosecution of the application, five separate amendments were filed, two of them substituting complete new sets of claims and one of them substituting a complete new specification, all without any official action on the case by the examiner. The claims as finally allowed were presented March 21, 1925, with the statement by the applicant that they were "in keeping with the understanding had with the Principal Examiner, on the occasion of recent conference". Notice of allowance by the examiner was filed April 2, 1925, and on the same day the final fee was paid by applicant, concluding the prosecution. The notice of allowance was the only action by the Patent Office during the entire prosecution (File Wrapper, Reeke-Nash record, Vol. IV, pp. 2020-2082).

The "method" claims are clearly invalid under the decisions of this Court, for indefiniteness and because they seek to monopolize all conceivable ways of accomplishing

the desired result, apart from the means for accomplishing that result which were proposed by the patentee. Such claims have always been forbidden by the patent law. Mitchell v. Tilghman, 86 U. S. 287, 391; Fuller v. Yentzer, 94 U. S. 288; Holland Furniture Co. v. Perkins Glue Co., 277 U. S. 245, 257; Knapp v. Morss, 150 U. S. 221, 227-228; Electric Signal Co. v. Hall Signal Co., 114 U. S. 87, 96; Hubbell v. United States, 179 U. S. 77, 86.

- (4) Claim 22. The holding of the Circuit Court of Appeals that this claim was invalid because it defined in terms of function and result the allegedly new element to which it was directed is fully in accord with the decisions of this Court to which we have just referred.
- (5) Alleged Conflict as to Whether Swan Was a "Pioneer". We have already seen that the only decisions as to the validity of the plaintiff's claims have been in the Sixth Circuit, and that the only decision on the issue of infringement outside the Sixth Circuit is the decision of non-infringement by the Circuit Court of Appeals of the Fourth Circuit in Swan v. Nash, which is in complete harmony with the decision in the case at bar (supra, pp. 12-13).
- (6) "Ignoring" the findings of the Special Master in the case of Swan v. Reeke-Nash, in holding claims 4, 5, 8, 9, 10 and 22 invalid. In the earlier case of Swan v. Reeke-Nash the Circuit Court of Appeals had an opportunity to pass upon the validity of these claims, but found it unnecessary to do so because the full relief sought by the plaintiff was being awarded under other claims. In the present case, in which the other claims were found to be not infringed, the Circuit Court of Appeals was required to consider these claims and has held them to be invalid. What the Court could have done in the Reeke-Nash case, it can certainly do in this case in which the record is much less favorable to Swan.

Conclusion.

The petition shows no sound reason for the granting of a writ of certiorari to review the status of this expired patent. The well-considered decisions of the District Court and the Circuit Court of Appeals below, both reached the same result and rightly held petitioner's patents either invalid or not infringed. The decision of the Circuit Court of Appeals, adhered to after a petition for reheafing, is entitled to special weight because of the familiarity of that Court with the prior litigation on these patents.

The case presents no unsettled question of general or public importance and no question as to which there is a conflict of decision between the Circuits. The decision below is not in conflict with any decision of this Court and is manifestly right.

The petition should therefore be denied.

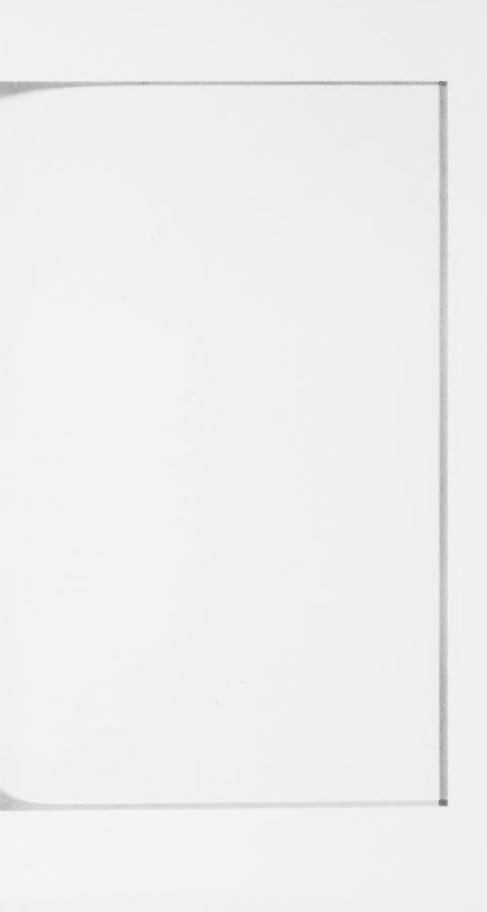
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December, 1942.



APPENDIX



APPENDIX

Swan's Statement Concerning His Invention

That the square cross-section passageways and sharp, square corners at the turns were in fact of the essence of the Swan invention is emphasized by the following statement made by Swan himself, in response to a specific question from the floor, during the discussion which followed the presentation of his paper to the Society of Automotive Engineers in 1923:

"Mr. Taylor: How much advantage is derived from the squareness of the manifold and how much from the sharp corners and other characteristics of the Swan manifold?

"J. W. Swan: * * * Now in a round1 pipe all1 the liquid deposited on the walls drains down the walls and naturally forms a stream-line in the bottom of this pipe, while in a square pipe the liquid deposited on the walls has a different action, as that which adheres to the top or ceiling either remains there to be carried forward with the next inrush of air, or if it drops off it falls to the flat level bottom. As the top and the bottom in the square section constitute one-half of the inside surface, it is readily seen that the liquid will not streamline but will spread out over the flat bottom that presents much greater surface for the liquid to come into contact with the air, thereby preventing stratification to a great extent. The sidewall drainage will also naturally spread out over the bottom. The virtue in the right-angle turns, and especially the turns from the vertical portion leading from the carbureter to the horizontal part, lies in the fact that the liquid particles in the mixture, due to their velocity and weight, cannot make a right-angle turn and are therefore carried up against the flat level ceiling from which they are swept into the branches, or failing to reach the ceiling are carried in the air stream somewhere between the right-angle turn and the ceiling and are not allowed

¹ Emphasis in original.

to flow around the inside of an elbow and stream, especially if the elbow is of circular cross-section.

"The right-angle turns at the ends of the horizontal branches are very similar in action to that at the center and prevent stratification and stream-lining, as in the case of the round-elbow type, thereby preventing flow to one cylinder in preference to the other at the entrance to the valve chamber" (V, 1678).





(26)

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DEC 12 1942

In the Supreme Court of the United States

OCTOBER TERM, 1942.

No. 530.

THE SWAN CARBURETOR COMPANY, Petitioner and Appellant Below,

VS

CHRYSLER CORPORATION,
Respondent and Appellee Below.

REPLY BRIEF FOR PETITIONER.

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Simmons v. Grier, 258 U. S. 82.

In the Supreme Court of the United States

OCTOBER TERM, 1942.

No. 530.

THE SWAN CARBURETOR COMPANY, Petitioner and Appellant Below,

VS.

CHRYSLER CORPORATION, Respondent and Appellee Below.

REPLY BRIEF FOR PETITIONER.

Reeke-Nash Decree was Final: Respondent is in error in asserting (Respondent's brief, page 15) that the decree in the Reeke-Nash case holding valid the claims here in suit was a "mere interlocutory decree, not a final decree on which alone an estoppel can be founded." This decree (R. Vol. I, pp. 19 to 21) disposed of every issue in the case and terminated the suit. Nothing remained to be decided by the court, so that the decree could not be other than final.

Respondent confuses this decree with the type frequently entered in patent cases in which an accounting is ordered to determine profits and damages. Such decrees have been held to be interlocutory for certain purposes (Simmons v. Grier, 258 U. S. 82, 89). In the Reeke-Nash decree no accounting was ordered (R. Vol. I, pp. 21) and nothing further remained to be decided. Thus the conflict between the decision below and the applicable decisions of this Court (Petition, Point F, pages 29 to 36) is present. It is not denied by Respondent except by the erroneous contention as to the nature of the decree.

Round and Square Manifolds: The patent in suit is not limited to manifolds of square cross section (Respondent's brief, pages 3 and 5). Round and other cross sections are illustrated in the drawing and described in the specification of the patent in suit (Record, Vol. IV, p. 1200, p. 1208, lines 6 to 12).

Heaters: The use of an exhaust heater on the manifold by Respondent and by the other infringers, as illustrated in the chart at the end of the Petition, is not a distinction from the patented invention (Respondent's brief, pages 3 and 14). The patent in suit shows the exhaust heater at 25 (R. Vol. IV, p. 1204), and describes it in the specification (R. Vol. IV, p. 1208, lines 36 et seq.).

New Issues: Respondent's argument (Brief, pp. 6 to 8) that the decision of the court below is right for different reasons is irrelevant to the issues on this petition. The basic error of the argument is that it deals with form and names of parts rather than substance and functions performed, contrary to the rule established by this Court in Machine Co. v. Murphy, 97 U. S. 120, 125.

Respondent's Chart: The statement on the chart opposite page 8 of Respondent's brief that the Reeke-Nash manifold was held to infringe "because of the sharp square corners," indicated by the red arrow, is incorrect. In each of the decisions in the Reeke-Nash case infringement was found because the Reeke-Nash manifolds operate like and achieve the result of the Swan manifold and carry out the Swan method (II R. N. 1124; Appendix to Petition p. 24; 88 F. (2) 876, pp. 887-888). In the picture of the accused manifold at the bottom of the chart facing page 8 sharp corners at the junction of the riser and distributing zone are clearly shown. This is the subject matter of claims 13 and 22 in suit. Claim 13 was found to be infringed by the Reeke-Nash manifold for the reason that in claim 13, as in the other claims, "the gist of the inventive

concept was the creation of the maximum turbulence as above described, not restricted to any particular form" (88 Fed. (2) 887).

Swan's Oral Discussion: The report of the oral discussion of the Society of Automotive Engineers of Swan's Fundamental Improvements in Manifold Design published in the Journal of that society (R. Vol. V, pp. 1665 to 1678), an excerpt from which is reproduced in the Appendix to respondent's brief, has been cited in most of the suits on the Swan patent. All of the courts have refused to accept the contention that anything said in this discussion can vary the terms of the patent, which discloses round cross sections and which is not limited to sharp square corners. The discussion was about a particular embodiment of the invention, not about the patent or the invention itself, so that even if Swan had said what respondent contends it would not be controlling or even material.

But respondent is in error. Swan made no statement that the square cross section and sharp, square corners at the turns were of the essence of his invention. Circular cross section elbows embodying the invention were referred to (Respondent's brief, p. 20). As to the corners, Swan said that the *virtue*, or the essence, is not the particular shape of the corner or the degree of sharpness, but the function which it performs in aiding turbulence and remixing.

Respectfully submitted,

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